An ethnographic study that explores the policy and cultural influences on the continuing professional development of nurses and their utilisation of computer technology in a community hospital in Uganda

Thesis submitted in accordance with the requirements of the
University of Chester for the degree of
Doctor of Philosophy

Frances Ruth Wilson

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Declaration

The material being presented for examination is my own work and has not been submitted for an award of this or another HEI except in minor particulars which are explicitly noted in the body of the thesis. Where research pertaining to the thesis was undertaken collaboratively, the nature and extent of my individual contribution has been made explicit.

Signed: _____

Frances R. Wilson

Dated: 31st July 2018

Dedication

I would like to dedicate this thesis to my husband MIchael for his total support, patience and encouragement, and to my children Penny, William and Duncan for all believing in me, also to my late parents who were always very proud of my achievements and taught me the value of education and tenacity.

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Acknowledgements

The seeds of this PhD were first sown during a university visit to Uganda. Nine years later upon submitting the thesis I wish to thank sincerely the many people whose input, guidance, moral support and forbearance were instrumental in its completion.

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Abstract

Through ethnographic fieldwork conducted in a hospital in rural Uganda, the study explores how continuing professional development (CPD) of nurses is supported through utilisation of information and communications technology (ICT), and how policy and culture can influence this process.

The existing research literature raised three questions: what facilitates and restricts learning and using computer technology? What are the nurses' views and experiences of using ICT? Is nurses' professional development and how they utilise ICT influenced by policy and culture?

The literature, drawn from international sources, is reviewed in chronological order to reflect the development of ICT and its use in health services and CPD. Policies and theories are analysed to gauge their relevance to the research aims and questions. These include Walt's policy analysis theory; Hofstede *et al*.'s dimensions of national culture; Rogers' diffusion of technology theory; Davies' technology acceptance model; and theories of culture. These theories are synthesised into a model of influence.

Early in the research, a macro study of Uganda was undertaken covering the political, economic, sociocultural, technological, legal and environmental (PESTLE) impacts on the ICT infrastructure, health and nursing. Spradley's (1979, 1980) developmental research sequence (DRS) formed the methodological framework, providing a systematic and comprehensive approach to data collection and analysis. Its twelve steps were applied to participant observation and ethnographic interviews, offering a progressive approach to data analysis through domain, taxonomic and componential analysis. Spradley's DRS enabled dimensions of contrast to be identified and the discovery of unique cultural themes. Four field visits took place between 2009 and 2012, each lasting two weeks. Participant observation was undertaken on each visit, and interviews and focus groups on the third and fourth visits, facilitating exploration of ICT developments, computer skills training, education and CPD. Informants expressed their views about cultural influences on technology development, and their knowledge of policies and how they impacted on ICT adoption and nurses' computer skills development.

The study makes a unique contribution to knowledge by analysing the influences of culture and policy on nurses' CPD and utilisation of computer skills. Major findings include the significance of cultural themes amongst factors influencing ICT adoption, CPD and development of nurses' computer skills. Knowledge of the local culture, as well as the underpinning theories, contributes to the successful construction of teaching strategies for this professional group. The impact of policies has been influential in building the national and local ICT infrastructure, but CPD and nurses' computer skills have developed in the research location due to local capacity building rather than the direct impact of policies.

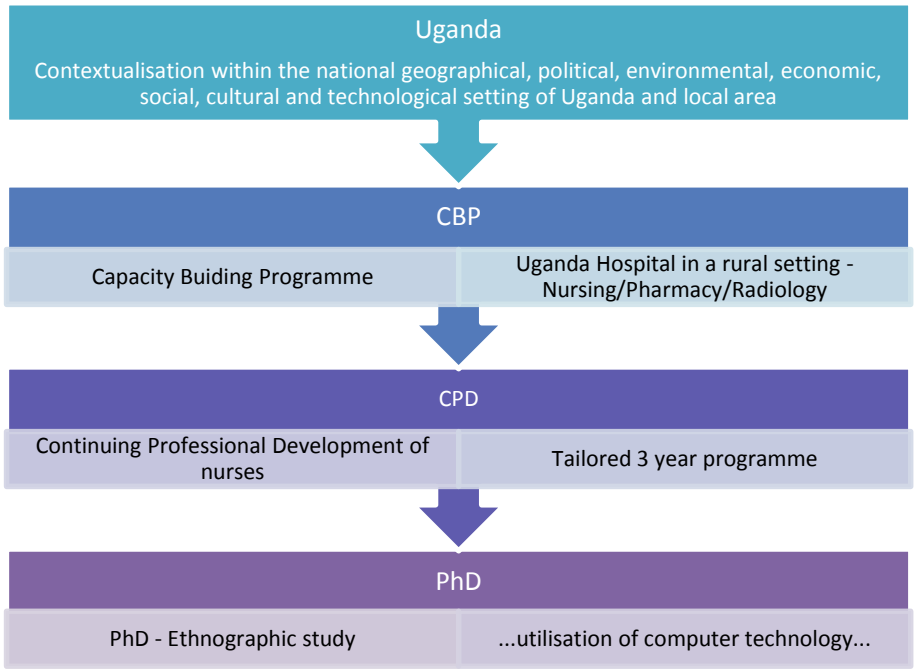
Chapter 1: Introduction

Introduction

Aims and content of the chapter and study

This chapter describes the aims and content of the study, and contextualises it within the wider geographical, political, economic and social settings of Uganda. The research study was located within a hospital in rural Uganda and was developed from a wider capacity building project (CBP) and continuing professional development (CPD) programme for nurses (Bryan, 2008; Gidman & Wilson, 2013; Hoyle, 2008). The relationship between these elements is illustrated in Figure 1.1.

Figure 1.1: The relationship of the PhD to the CPD and CBP programme and national and international context



Summary of chapters

Chapter one provides a rationale for the origins of the PhD research which emerged from the wider capacity building (CB) and CPD programmes. The scoping (Hoyle, 2008) and evaluation report (Gidman & Wilson, 2013) confirmed that there was no CPD available for nurses at that time. Local access to the internet, although limited, offered an opportunity to explore access to, training in and utilisation of computer technology experienced by the participating nurses, as stated in the aims and

objectives of this research. The chapter also presents background information about the capacity building and CPD programmes and the research setting including a description of the local area, cultural setting, way of life, hospital system, funding, employment, nursing in Uganda and available technology which is substantiated by references to international and Ugandan policies and research literature.

Chapter two. This chapter critically reviews and synthesises professional literature and research obtained from international, African and Ugandan sources relevant to the research aims, which are to explore the continuing professional development of nurses, their utilisation of computer technology, and the influences of policy and culture. Ten themes emerged and were used to frame the chapter (Table 2.2).

Chapter three. The aims of the chapter are to undertake a comprehensive study of Uganda by applying a PESTLE analysis framework and incorporating selected policies, cultural models and theories generated from the literature review. The literature review inspired a further targeted search of Ugandan policies and cultural and technological theories relevant to the research that are central to supporting computer utilisation and nurses' continuing professional development.

Chapter four. This chapter provides the methodological basis for the research and justifies the use of Spradley's methodological framework to analyse ethnographic data. Spradley's developmental research sequence (DRS) is presented (Table 5.3). The process of gaining ethical approval is outlined with specific consideration of undertaking research in a developing country.

Chapter five. This chapter recounts data collection and domain, taxonomic and componential analysis. The data is presented chronologically and systematically following Spradley's DRS which is applied to participant observation, interviews and focus groups. The overarching domains and cultural themes are presented as a model (Figure 5.9).

Chapter six. The discussion chapter seeks to contextualise the data within the theoretical frameworks and literature review. A composite model is presented that encapsulates the thematic connections between the data, literature, policy, culture

and theory (see Figure 6.1), and the influencing, limiting and facilitating factors that impact on nurses' development of computer utilisation skills in the context of CPD (Figure 6.3).

Chapter 7. Conclusion and recommendations. The chapter and thesis conclude with gaps identified in current knowledge and recommendations for CPD development, computer utilisation and further research.

Background and rationale to the PhD research study

A CPD project was proposed which aimed to develop long-term partnership links between a hospital and university in England and a hospital in Uganda. An application was submitted for 'seed corn' funding to the Tropical Health and Education Trust (THET) which was approved in December 2007. THET is a charity that works with developing countries and was part of the project initiation (Bryan, 2008). The potential for PhD studies was identified by the university following a scoping visit in 2008 which recommended proposals for such PhD studies to be developed from the project (Bryan, 2008; Hoyle, 2008).

The focus for this PhD study is to research the impact of the CPD programme on the continuing professional development of nurses by exploring nurses' acquisition and application of new knowledge and skills in relation to the utilisation of computer technology. In addition, the influences of culture and local and national policies are considered as factors in their acquisition and utilisation. It is anticipated that the utilisation of computer technology has the potential to influence capacity building and long-term sustainability of the CPD programme in the research setting, and the capacity to influence nursing development beyond the research setting itself.

My interest in ethnography began as a practitioner in public health and latterly as an academic at a university in England. The broader context of cultural and political influences on public health and healthcare delivery has been central to my professional interest and career in public health. I completed modules in Ethnography and Research in Educational Technology as part of a master's degree, and was keen to apply this knowledge and put the theory into practice as a researcher in the field. The opportunity arose to undertake a PhD in association

with a capacity building programme (CBP) in Uganda that provided the ideal setting in which to undertake an ethnographic study of the utilisation of computer technology in keeping with my research interests.

Aims and objectives of the research

Reflecting the title of the thesis, the aims of this research were to explore how the CPD of nurses can be supported through utilisation of computer technology, and how policy and culture can influence the process.

These aims were operationalised through the following objectives:

1. Provide a background to the concept of the thesis, the research setting and relevant factors that may be influential in the utilisation of computer technology.
2. Undertake a critical review of the literature relating to the aims of the research on the utilisation of computer technology and its effect on the professional development of nurses, including appraisal of the impact of policy, culture and other factors.
3. Justify ethnography as the preferred research methodology for the thesis.
4. Critically analyse and triangulate data obtained from participant observation, informal conversations, interviews, focus groups, field notes and reflections to determine the extent of engagement with computer technology and the impact of influencing factors.
5. Provide an accurate description and representation of the 'emic' or 'insider view' of informants in relation to engagement with computer technology.
6. Apply an appropriate theoretical framework to underpin the research and critical appraisal of the research data.
7. Make recommendations which may inform future practice, policy and research relating to working in a developing country and sustaining change through a CPD programme which includes the utilisation of computer technology.

Hammersley and Atkinson (2007) offer three main purposes of ethnographic research which relate to the aims and operationalisation of this study. Firstly, the

description of phenomena or producing descriptions and explanations of the explored situation; secondly, the testing out or challenging of existing theories; and thirdly, developing new theory. The latter was not a specific aim, although the research may point to recommendations and new models of learning related to the setting. Data gathering and analysis will be linked to the aims and objectives of this research, as demonstrated in later chapters. Spradley (1979, p.3) states that "Ethnography is the work of describing culture…to understand another way of life from the native point of view." Additionally, he suggests that "Ethnography starts with a conscious attitude of almost complete ignorance." From Spradley's perspective, which seems to concur with this thesis, by attempting to understand the people, or 'natives', then we can begin to understand their actions. It is from these concepts that the thesis has developed.

Context of the study and research setting

Overview of the capacity building project and scoping visit

This section describes the starting point for the PhD research that has developed out of the capacity building and CPD programmes to support capacity building (UNCED, 1992) of quality healthcare services. The aims of the programme would be achieved through supporting professional groups including nurses, pharmacists and radiographers, to address local services and staff development needs and to maintain long-term sustainability of changes made within the hospital to beyond the timescale of the programme (Gidman & Wilson, 2013). The initial proposal for a link between the organisations was suggested by the medical superintendent of the community hospital in Uganda after an educational visit to the UK in 2006. The next step involved a visit by senior personnel from the UK hospital to Uganda in 2007 to explore the feasibility of establishing the link prior to a formal scoping visit in 2008. The scoping visit included senior hospital staff and a representative from university nurse education. The key aim of the scoping visit was to provide a report which would "identify a minimum of three projects, one from each service area, to be worked upon over the next three to five years" (Hoyle, 2008, p.4). The identified team assessed the current service provision and explored the views, commitment and strengths of the organisation, and its potential for development and change:

the projects had to be sustainable, build on good practice and local capacity, and link to the Ugandan Health Strategy (Hoyle, 2008; MOH, 2004, 2012). To achieve this, a comprehensive audit was undertaken of available equipment and technologies, organisational systems, clinical practices, training and educational provision for the different departments and professional staff involved. Consequently, the project was to include the three areas of radiology, medicines management services, and nurse development and education, all encompassed in a partnership approach and using an established link (Gidman & Wilson, 2013).

It is customary for projects such as this to be discussed at the Ministry of Health in Uganda (MHU) prior to commencement. A visit was arranged by the scoping team to the Health Commissioner at the Ministry to explain the purpose of the visit and the proposal to establish a link, which was given the 'stamp' of approval. The proposed link would complement the Ugandan 10-year National Health Policy plan (MOH, 2010) which sets out to improve the financial and human resource infrastructure of hospitals and disease management, both existing and emerging, due to changes in lifestyle and advances in medical treatments, as well as addressing training needs and staff development. The project also aligns with the government's research strategy and its requirement to be cognisant of individual projects, to be updated as they progress and at completion (UNCST, 2007). The evaluation report (Gidman & Wilson, 2013) met the requirements of the Ugandan research strategy to provide a final report of the achievements of the project.

Project and PhD funding

Bids for project funding were made to the Tropical Health and Education Trust (THET) and the British Council (BC) in 2007 by the UK and Ugandan partners (Hoyle, 2008). This was to provide travel and accommodation expenses for the staff teams, and cover auditing and evaluation costs of the project. Charitable status was also achieved by the partners in the UK, for the lifetime of the project, enabling fundraising to take place for additional equipment and identified educational needs. These types of link are well-established in different parts of the world and not just in developing countries. Examples of such links can be found in the THET's annual reports and individual evaluations and are considered later in the thesis.

Following the scoping visit in November 2008, three possible PhD studies were identified. The University agreed to fund the PhDs and provide the necessary support for their undertaking. The funding of the CBP provided an opportunity for the author, who was professionally involved with the delivery of the nursing CPD programme, to undertake PhD research and be involved with the final evaluation of the capacity building programme. A PhD application was made to the University research committee and approved in 2010.

Capacity building

Adhering to agreed capacity building principles that are embraced by the country and internationally enables projects such as these to develop and succeed (THET, 2016). It is important that the process is seen strategically as well as from an individual or institutional perspective to enable it to fit with the long-term planning aims and objectives of the developing country concerned, in this case Uganda. The United Nations Conference on Environment and Development (UNCED, 1992) describe capacity building as:

> Specifically**,** capacity-building encompasses the country's human, scientific, technological, organizational, institutional and resource capabilities. A fundamental goal of capacity-building is to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options, based on an understanding of environment potentials and limits and of needs perceived by the people of the country concerned. (Capacity Building - Agenda 21's definition, Chapter 37, UNCED, 1992)

Capacity building, according to the *African Governance Report* (2009), also emphasises that training should be targeted and sustainable to achieve better performance of an organisation or society. Equally important are for staff involved in the project to understand these parameters and to align the aims and objectives of the CBP with Uganda's vision for the future, as indicated in *Uganda Vision 2040* (MHU, 2012). The project must be able to demonstrate that aims and objectives have been met through regular audits to meet the ongoing and final evaluation requirements of the THET funding grant (THET, 2007).

With acknowledgement of these factors, a three-year plan was devised for each part of the project to include ongoing audits at each stage and a final evaluation report. Details of these were submitted to THET at six monthly intervals after each visit, and at the end of the project following a final evaluation visit undertaken in December 2012 (Gidman & Wilson, 2013). At each visit, staff from the UK disseminated and exchanged their skills and knowledge with local staff to build capacity that was intended to be sustainable beyond the three-year term of the project. This also involved some of the Ugandan staff visiting the UK to experience working and learning in a hospital and university environment, in a mutual exchange of clinical and cultural learning and development. Email communication was maintained between UK and Ugandan partners throughout the project to ensure updating and continuity of the programme were achieved.

Other capacity building programmes

There are other CBP projects being undertaken in Africa to improve nursing and healthcare practice. Differences between these projects include their length e.g. 12 or 24 months duration; amount of funding available; types of partnership involvement e.g. hospitals, universities, voluntary organisations; and types of project e.g. medical or nursing practice or educational focus. In this project, the programme was longer than projects typically taking place elsewhere with ongoing monitoring and auditing of the impact, outcomes and evaluation of the programme in place. It should be noted that this is one of very few projects to include a UK partnership between a hospital and university working together to deliver a programme in a developing country. THET (2015) suggests that other differences are the cultural and political influences on the workforce that are unique to each project, and being able to establish, implement and sustain a project to achieve a long-term legacy. The generalisability of knowledge and learning between projects must be approached with caution due to major differences in infrastructure, as not all programmes have been robustly evaluated (THET, 2015).

CPD programme for nurses and computer utilisation

The CPD programme was supported and sustained through access to computer technology, CD-ROMs and USB data sticks ('flash drives'), and e-learning materials which were developed and made available during the programme. It is this part of the programme on which the PhD is focused. The aim of the CPD programme was to enhance the roles of qualified nurses and to develop the educational and clinical experience of all nursing staff that would impact on the quality of patient care. The content of the CPD programme incorporated learning and teaching materials adapted from BSc and MSc modules delivered in the UK. Outcomes as a result of the CPD programme demonstrated that nurses were able to implement new techniques and disseminate up-to-date knowledge to others in everyday nursing practice; this was confirmed through auditing as part of the final programme evaluation. The use of computers, and skills to search for information, was part of the CPD programme and all participants were provided with CD-ROMs and USB data sticks containing teaching material to support learning at each stage of the programme (Gidman & Wilson, 2013). Over the duration of the CPD programme there were notable changes in the hospital staff, as some left for jobs elsewhere and new staff joined. Because each educational visit was a self-contained unit of learning, new staff could join the programme as it progressed. Teaching materials from previous educational visits contained on CD-ROMs or USB drives, and photocopies of articles and handouts to facilitate learning, were supplied to any new staff.

Three senior nurses were nominated by the hospital to embark on a higher degree level of study with and supported by the UK university. They would undertake part of their studies in the UK and access online learning from Uganda. They were therefore required to have access to computers to connect with the internet and university intranet. These nurses were interviewed individually and contributed to focus groups alongside other nurses as part of this research.

Other types of education available to the nurses in the setting

In the project area, no extended CPD programmes had been previously available locally for nurses as identified in the scoping visit (Hoyle, 2008). Usually, nurses must travel to the capital, Kampala, to undertake further professional development or training. Indeed, nurse tutors from the school of nursing had been previously seconded to undertake further registration training, as well as clinical nurses to develop specialised nursing skills such as mental health, paediatric nursing or sonography. The hospital, or sponsoring/seconding organisation, also loses that member of staff for weeks, months or years, and is reliant on that person to return with new knowledge and expertise. Staff may not always return, preferring the opportunities afforded in bigger cities and hospitals. This is common practice throughout many parts of Africa as the main healthcare and educational resources are only found in larger cities and centres, and is an accepted model for furthering professional development and undertaking training (WHO, 2014b). The impact on family life, especially those with young families, can include separation for extended periods which seems to be acceptable in the face of no alternative at the research location.

The literature review chapter identifies examples of educational programmes requiring residential commitment, but also examples of where e-learning is beginning to replace it.

Sustainability of the CPD study and cost implications

This type of CPD programme is potentially sustainable as it was delivered on site and does not require staff to be absent for long periods. However, the cost of staff travelling from the UK to provide the CPD programme was included in the funding bid and as such is unreliable in the long term. Depending on the nature of education and training required, there will still be a need for Ugandan nurses to travel to more specialist training centres (Gidman & Wilson, 2013). Indeed, staff are often under a contractual obligation and would incur a financial penalty if they did not return to make use of their enhanced capabilities (Local hospital policy, 2012; WHO, 2014b). This was seen to be enforced when a member of staff left the

hospital to take up a more senior position. Access to more formal distance and online learning programmes is increasing as access to the World Wide Web becomes more reliable in remote rural areas (Gidman & Wilson, 2013). The cost of online learning remains high as it involves ownership or regular access to computers and time to study. Support from employer organisations or applications to funding bodies for educational grants are needed to sustain development (WHO, 2014b). This concept will be explored further and supported by evidence in the literature review and data analysis chapters.

Evaluation of the CBP and CPD programmes, and their significance to the study

The evaluation report undertaken by Gidman and Wilson (2013) contained aspects that informed the PhD study, including the provision of background information, and specific points for consideration when undertaking the final stages of the literature review and data analysis. The information emanated from focus groups undertaken in Uganda and in the UK for staff who were involved directly in the CPD project to inform the evaluation report, not the PhD study directly.

A participant in the Ugandan staff focus group commented about computers and their availability for nursing staff on the CPD programme:

> *…there is lack of computer availability for nurses to continue to access evidence and to continue their own professional development… (*Focus group, Gidman & Wilson, 2013)

During the three-year CPD programme, the hospital and its staff benefited from the provision of professional development on site, and the promotion and utilisation of computer technology for academic study. The module on evidence-based practice included how to search the internet and use search engines to access, for example, nursing related research-based journal articles. Other modules were supported with internet links to referenced information. In addition, the possibility of being able to undertake further study and qualifications by e-learning using internet technology also became apparent to both participants and senior management as the programme progressed. Three nurses were undertaking degree programmes with the university, supported by online learning. This is an important consideration as financial constraints can dictate the amount of formal CPD available locally for

healthcare staff, but the provision of and access to computer technology can have a positive impact on staff development through availability of online learning and regular access to information (Mugisha, 2009).

The UK university staff-based focus group reported that: “involvement in the project has broadened their understanding of Ugandan culture and cultural barriers and that this has helped to develop their abilities to interpret and analyse situations” (Gidman & Wilson, 2013). The UK staff also commented on the impact of increased knowledge that may be a mechanism for “power and control and envy of opportunities” for those who have benefited from the CPD programme. The team also acknowledged that some of the Ugandan staff may be at “personal risk as they become empowered and more vocal”. The UK team also commented that “the religious influence had been underestimated by them (the team)” and that “God’s will is sometimes used to avoid professional accountability.” The UK team reported that the project had “empowered participants to make the most of opportunities” and this would benefit patients wherever they worked (Gidman & Wilson, 2013).

The cost implications of training that requires absence from the hospital for varying periods versus provision of locally delivered CPD programmes or obtaining academic qualifications through e-learning or online learning were not formally calculated. However, the programme was considered beneficial due to the increase in knowledge, skills and achievement of higher education awards, as concluded in the project audit and evaluation (Gidman & Wilson, 2013).

The following section provides an insight into the local cultural setting and way of life as observed in initial and subsequent visits to the local community. Information was obtained from participant observation, discussion with local hospital staff during educational visits, and from the proposal, planning and evaluation papers written by senior UK personnel involved with the project (Bryan, 2008; Gidman & Wilson, 2013; Hoyle, 2008).

Local area infrastructure

The research location for this thesis, the community hospital in Uganda, is in a very rural area served only by unmetalled roads and tracks. However, its strength as a

location is based on access to a clean and abundant water supply which has also been harnessed to provide hydroelectricity and a reliable source of water and power for the hospital and surrounding district. Coincidently, access to safe water and electricity is part of the government's development strategy (NPA, 2013) and the Sustainable Development Goals (SDGs) (2015), and is an important factor in control of disease and better health outcomes. The potential of this setting to establish a hospital was identified in the 1950s by UK missionaries and it has developed an 'unrivalled reputation' for its healthcare provision, attracting increased attendances year on year, not only by the local population but from a wider catchment area (Gidman & Wilson, 2013; Hoyle, 2008). This has led to the hospital's growth and medical expertise, attracting doctors and nurses from around the world to work there, whether it is for a few weeks, months or years. This in turn has led to the further development of its healthcare provision and services in the local area, despite poor road access.

The government's development plan (MHU, 2012) seeks to extend the tarmac road to the area from the main Ugandan highway during the next decade. However, even in 2018 this has not happened. There are improvements to road infrastructure connecting main centres of population, but roads in rural areas of scattered population remain in poor condition, increasing travelling time, reducing access to healthcare and educational facilities, and negatively impacting on the rural population's health and literacy (MHU, 2012). Improving road access to and from the hospital is considered a benefit, such as improving access to other parts of Uganda, bringing prosperity to the area with easier access to healthcare, education, jobs and markets. Elsewhere, poor road access is cited as a factor in reduced uptake of services in rural areas (MHU, 2012), but this has not been the case in this hospital. Increased access to the area for healthcare has resulted in an increase in small businesses being set up including an internet café, shacks serving alcohol and access to money lending. The internet café only lasted for approximately one year, then it closed through underuse. Much of this development is viewed negatively from an emic perspective as it may encourage local people to incur debt, or indulge in alcohol consumption and prostitution. There is evidence from the literature

review and research undertaken in Uganda that social change, economic factors and increased access to alcohol have led to an increase in prostitution (Tugume, 2015).

The way of life and hospital system

Coexistence between the very rural outer areas of population, the immediate community township, the hospital and the healthcare workforce has evolved over 60 years to become a well-established community. The hospital has become the focus of the immediate and wider surrounding communities, and provides outreach services for antenatal, child health and vaccination clinics etc. to the surrounding areas (Hoyle, 2008).

It became evident that tensions have arisen between different factions of the community, the workforce and visitors to the hospital; additional tensions are potentially caused by the impacts from wider government strategy on development, including the road infrastructure and indiscriminate use of technology (MHU, 2012). During the timescale of the project and research, changes have occurred in leadership and control of the hospital, resulting in observable changes and clashes of culture in hospital community dynamics and relationships between different factions of personnel; this is illustrated in the data analysis.

Since its inception, the hospital has grown in service provision and staffing levels to meet the increasing demands from the local population and those travelling further distances, as the reputation of the hospital spreads. The evaluation report also describes the research location as ‘A place to live and work.’ (Gidman & Wilson, 2013).

Hospital funding system

The funding system is supported by the government and managed by the hospital-based health society insurance scheme and micro insurers launched in 1996 (Dror & Preker, 2002). With many thousands of potential users, premiums are collected from the local population based on family size, but are not intended to cover the whole cost of any treatment as discounts are provided on inpatient and outpatient healthcare needs. However, no one is turned away and healthcare is supplemented

by a percentage from the government, charitable contributions from the hospital itself (much of it raised in the UK), and other sources of funding such as direct payments by those who can afford it. It was estimated nationally that by the year 2000 approximately 50% of individual contributions covered hospital costs, thus leaving a funding gap (Dror & Preker, 2002). Analysis of this data identified that potential efficiency savings could be made from prescriptions and medicines management. However, it is difficult to set contributions when exact expenditure is unknown, in a country where a high level of poverty exists, and population sizes and numbers of potential users of the system are only estimates or at best approximated (MHU, 2012). The Ministry of Health in Uganda undertook to compensate for any losses in the early years of the scheme, but malaria epidemics and the rise in HIV/AIDS patients are high cost areas of treatment. Reinsurance schemes are also a consideration to help with any shortfall. At the same time at the introduction of the scheme, the MHU provided computer equipment under a project funded by the Department for International Development (DfID) in the UK (Dror & Preker, 2002). The system remains in place at the current time and is monitored by the MHU.

In the last few years, the hospital has worked in partnership with several organisations on projects which have secured further income, including funding from the World Health Organization [WHO] to improve infection, prevention and control; funding from various charities in the UK ('friends of the hospital'); improvements in maternity care and baby incubators; new operating theatres and mental health facilities; and the development of a project supported through the British Council and the THET to professionally develop nursing staff, and radiology and pharmacy departments (Gidman & Wilson, 2013; Hoyle, 2008). In 2018, it is estimated that about 10% of the funding comes from the government and inter-religious councils of Uganda, and 40% from charitable donations. The remainder is generated locally.

Employment

From a human resource perspective, wages are lower in faith-based hospitals than in government funded hospitals, and accommodation was limited at the time of the

report which may be a factor in staff recruitment in all areas, not just nursing (Hoyle, 2008). This factor is acknowledged locally and nationally by the Ugandan Nursing and Midwifery Council (UNMC) (UNMC, 2014). The potential to earn a higher salary in a government-based hospital is balanced by the commitment of staff to a faith-based approach to care and living in a faith-based community, and all that this has to offer (Spillman, 2015) such as a Christian lifestyle. According to Oliver, the comparison of different types of provision is complex, and leading to a lack of robust research and empirical evidence to substantiate specific claims about motivation of staff. However, faith-based hospitals play an important part in Africa's economy, especially where healthcare systems are weak and under-resourced. Indeed, satisfaction with faith-based hospital provision as far as it can be ascertained is higher than in other types of provision (Oliver *et al.,* 2015). The World Health Organization (WHO, 2008, 2014b) acknowledges the worldwide shortage of the healthcare workforce. In the African region, it is estimated that by 2035 there will be a skilled workforce deficit of approximately 1.8 million people (WHO, 2014b). Financial incentives, continuing professional and career development opportunities, and free housing are cited as ways to improve the retention and equity of health worker distribution, especially in remote and rural areas. Other measures include addressing education needs, such as access to CPD programmes, and decentralised training. These broad recommendations from the WHO seem to fit with the CPD programme offered in the remote rural area in which the study was located. Further analysis in a report published by the World Bank [WB] (Soucat, Scheffler, & Ghebreyesus, 2013) estimates that every day 37% of health workers in Uganda are absent from work with no reason offered. Consequently, there is a need to address staff motivation and retention factors. These are discussed in the literature review.

Professional development of nursing in Uganda and locally

Hospitals and schools of nursing in Uganda are funded through four types of funding stream, categorised as being wholly government funded, privately funded, university funded or faith-based funded through charitable donations. However, for each category other than government, a small percentage of funding does come

from the government. The hospital and associated school of nursing in the study is approved by the Ugandan Nursing and Midwifery Council as a faith-based school of nursing. The community hospital is a faith-based hospital funded through charitable donations and fundraising in the UK, Ireland and USA. Access to care by patients is supported by a health insurance scheme as discussed previously.

In the study, there was a limited number of qualified nurses throughout the hospital and school of nursing which contributed to lack of continuity of care and working regularly with individual student nurses. It was also ascertained that there was a lack of clinical supervision for qualified nurses. On considering this further, according to the Ugandan NMC (2014) there is a shortage of qualified nurses on the national register held by the council. This has implications not only for the local hospital, but throughout Uganda. Trained nurses already undertake a range of procedures including giving prescribed medication, venepuncture, dressings and assisting with ward rounds that student nurses could observe. However, the amount of hands-on nursing care given by nurses to patients is limited, or underutilised, as relatives and carers usually provide basic care including washing and toileting, preparation of food and feeding. An outdoor kitchen area is provided at the back of the hospital for relatives to prepare food. Relatives and carers are usually present for the duration of the patient stay in hospital, often sleeping under or by the bed. It should be noted that these practices have grown out of cultural tradition, lack of hospital facilities, long travelling distances and lack of personal transport (Hoyle, 2008). These aspects of culture are explored further in the data analysis.

Internet technology and local intranet

The hospital has its own intranet funded initially by government and now a UK patron who enables the system to be maintained. Further investment in technology is a controlling factor in the provision of the system and infrastructure, computer terminals and laptops. These are largely funded through equipment donations and other external funding. Uganda is committed to developing the National Backbone Infrastructure (NBI) for IT to improve the speed of internet connections throughout

the country (MICT, 2012). The infrastructure continually evolved throughout the duration of the research study.

Access to computer terminals is available at the school of nursing and local primary school, and a computer technician provides basic training for staff. Since 2012 when the final evaluation was completed (Gidman & Wilson, 2013), there have also been developments to the computer databases for the outpatients' department and financial management systems. There is a radio and mobile phone mast on a nearby hill that enables limited technological access. Signals are variable and often weather dependent. The most common form of technology available is mobile phones, with very few televisions or personal computers in private ownership at the outset of the research. Personal funding of televisions, computers/laptops and mobile phones is constrained by the amount of disposable income, which may make purchasing and access difficult for individuals. Educationally, internet technology can facilitate distance learning and enable nurses to learn at home, rather than travelling long distances with the resulting loss of family life and continuous employment that this can bring. Alternatively, a matter of concern for some is the increased access and exposure to global information and perceived negative influences that technology brings. This links to the overall Information and Technology Policy for Uganda (MICT, 2012), which aims to develop the IT services and communication for all areas, including health. The policy acknowledges low computer penetration and a high rate of IT illiteracy in both private and government sectors. The lack of local knowledge of these factors is evident in the data analysis.

In addition, the technology policy (MICT, 2012) has been partly developed to support the implementation of all eight Millennium Development Goals (MDGs) (UN, 2015), and specifically goal 8F: "In cooperation with the private sector, make available the benefits of new technologies, especially information and communication." Indicators include the number of fixed and mobile telephone lines and subscriptions, and internet users per 100 inhabitants (UN, 2015, p.67). The report also comments that although mobile phone and internet penetration is continuing to expand, there is a growing digital divide between rich and poor. The

Sustainable Development Goals (SDGs) (WHO, 2015) go further to emphasise the growth and use of ICT in developing countries to improve health and the adoption of e-health to enhance communication between health workers and communities. Some of the challenges are cited as resistance by health professionals and organisations to new models of service delivery, including use of ICT, and lack of investment is also an issue. Low income countries, including Uganda and those in sub-Saharan Africa, currently have limited internet bandwidth and capacity which impede affordable internet services (WHO, 2015). In 2015, about 82% of the population in developed countries used the internet; this contrasts with 33% of the population in developing countries, only 21% in sub-Saharan Africa, and less that 10% in least developed and rural areas (UN, 2015). However, this situation is constantly improving with the latest figures showing that in 2017, the average internet penetration in Africa is 35.2%, but in Uganda the figure is higher at 42.9% (Internet World Statistics, 2018).

Conclusion

The first chapter has provided an overview of the content of the thesis, described its aims and objectives, and provided contextualisation of the research within a wider capacity building and continuing professional development programme undertaken in Uganda from 2009 to 2012. It considers findings from the evaluation of the CBP and CPD programmes and their significance to the research study. The local setting is contextualised within the wider country of Uganda and describes the local and national infrastructure, including internet communication technology, the hospital funding system, local employment and the professional development of nursing in Uganda. These areas provide the basis for further enquiry.

Chapter two contains a critical review and synthesis of professional literature, situating Uganda in the wider context of international research and identifying three overarching research questions that are revisited throughout the thesis.

Chapter 2: A Critical Review of the Literature

Introduction and aims of the chapter

The chapter will critically review and synthesise professional literature and research relevant to the research aims, which are to explore the continuing professional development of nurses, their utilisation of computer technology, and the influences of policy and culture. The selected literature is organised into key themes of global, international and Uganda-based literature in a chronological sequence to reflect the developmental nature of information and communication technology (ICT), including the use of computer technology (CT) in health services and its application to CPD and training of nursing and health workers. It was apparent when reviewing the literature that it tended to refer to health workers or medical personnel, with fewer papers relating specifically to nursing. However, on scrutiny, many of the studies included nurses under a more general heading of health workers or professionals. In addition, relevant literature sources with potential for transferability to this study are considered and discussed later in Chapter 6. The first two themes contained most of the literature, but many papers included several themes, thus resulting in overlap of papers in some of the themes.

The literature search and review were an iterative process (Williamson & Whittaker, 2017) that was returned to and developed at different stages in the research journey. At the outset of the research, in 2010, a preliminary literature search was undertaken to inform the research proposal and the ethical approval process. This was revisited, and initial searches were extended after participant observation, interviews and focus groups during the data collection and analysis in 2011 and 2012 and repeated in 2017 during the final writing up of the thesis to ensure that the most up-to-date research has been considered. The nature of the core subject area of information technology has continually evolved, impacting on its potential for use in CPD over the timescale of this research.

The literature search and review also informed Chapter 3, which continues to analyse in greater depth to inform the policies, theories and cultural perspectives which have formed the underpinning framework for this research.

Purpose and justification of the literature review

The purpose of the literature review is to provide information about what is already known about a subject. The review may reveal extensive or limited research already undertaken on the subject, and where the author's research will fit with current knowledge (Silverman, 2014). The review can also provide a background to the subject and justification for the research project (Bryman, 2016). Parahoo (2006) suggests that critical literature reviews should have four functions: to provide a rationale for the research; provide an objective review of previous research and a critical debate of alternative arguments; select important aspects of the research papers pertinent to the new research without bias; and to select the most up-to-date articles that are not, in the context of evolving technology, 'out of date'.

According to Bryman (2016), there are two types of literature review: narrative reviews and systematic reviews. He differentiates between the two approaches by describing systematic reviews as standalone studies incorporating very specific techniques, rather than a requirement before undertaking research. According to Bettany-Saltokov (2012) by contrast, systematic reviews are summaries of research literature focused on a single question, and incorporate inclusion and exclusion criteria and critical appraisal of the research. Narrative reviews (Bryman, 2016) include an examination of both research and theory and provide "a reasonably comprehensive assessment and critical interpretation of the literature, usually as a prelude to conducting one's own research in the area" (Bryman, 2016, p.91).

A critical or narrative review of the literature has been undertaken in preference to a systematic review because of the multifaceted nature of the thesis and to review a wide selection of literature that informs this research. Some of the search criteria used in systematic reviews have been included in this literature review to provide a more developed critical approach to selection of the literature (Bettany-Saltikov, 2012; Bryman, 2016).

Literature search strategy

The title of the research was used to structure the literature search strategy and the inclusion and exclusion criteria of the search by applying a population, exposure

and outcomes (PEO) model of analysis. The purpose of this was to identify the 'population'; 'exposure' to phenomena; and 'outcome' or themes (see table 2.1). This model was devised by Khan *et al*. (2011) for qualitative studies and is a variation on the population, intervention, comparison and outcome (PICO) framework (Sackett *et al.,* 1997) devised for structuring a literature search based on quantitative studies (Bettany-Saltikov, 2012).

Table 2.1: PEO (Population; Exposure; Outcomes) model for the study

The title of the thesis is: 'An ethnographic study that explores the policy and cultural influences on the continuing professional development of nurses and their utilisation of computer technology in a community hospital in Uganda'			
PEO – identify key words and alternative words. Vertical and horizontal combinations used	**Population** – the population and their problem	**Exposure** – exposure to phenomena	**Outcomes/themes** – views and experiences
Definition of PEO applied to study	• Nurses in a community hospital in Uganda • Utilisation of computer technology AND	• Computer technology • Continuing professional development • Culture and policy AND	• The nurses' views and experiences of using computer technology & influencing factors. • Views of significant others AND
OR/AND	Computer technology (CT) utilisation	Computer technology (CT) and/or ICT	Nurses and/or healthcare workers
OR/AND	Uganda (LMIC, Africa, 'Global')	Professional development (CPD)	Computer technology/ utilisation of CT
OR/AND	Nurses (HCW, Drs)	Culture	Policy
OR/AND	Nursing (HC professionals)	Policy	Culture

The PEO template is adapted to include the identification of key words included in the literature search based on analysis of the thesis title and overarching research question (Bettany-Saltikov, 2012; Khan *et al.,* 2011).

The critical review is based on a comprehensive search of the literature on the key words and synonyms identified in Table 2.1 including combinations of 'Uganda', 'computer technology (CT)', 'information and communication technology (ICT)', the 'utilisation of computer technology', 'continuing professional development of nurses', 'policy' and 'culture' as the main areas for consideration. Several electronic databases were searched using a university library search engine to ensure broad coverage of potential academic sources. These included: CINAHL, CINAHL Plus, ProQuest for Nursing, PubMed, Science Direct, Socindex, Web of Science and Google Scholar, using the same combination of key words. Many repeats of research-based journal articles were found, but three additional journal articles were identified in Google Scholar (see Appendix 3).

All search terms included the caveat of 'Uganda' to determine what research has already been undertaken in Uganda before potentially narrowing or widening the search, depending on returns, to include e.g. low and middle-income countries [LMIC], and those with a more global orientation (Khan *et al.,* 2011). Some studies were identified that related to the main area of the study as determined by application of key selection criteria (Oliver, 2014). The search, although refined down to manageable numbers of research-based journal articles, revealed research from outside Uganda. Some of these sources were selected due to near matches of inclusion criteria to allow comparisons between Uganda, other African and low and middle-income countries, and with wider developments in ICT and nursing from a global perspective.

The initial search terms of CT and ICT resulted in millions of hits. A subsequent advanced search using a combination of search words and application of Boolean operators, and further refining using dates and scanning of titles and abstracts, reduced the number of relevant journal articles to 463. Further detailed scanning

based on specific inclusion/exclusion criteria resulted in a final selection of 50 articles for inclusion in the literature review (Appendix 3, Tables 2 and 3).

Most articles were research based including empirical research, literature reviews and systematic reviews. Other articles were retained to contribute to a general overview of the topic, such as opinion papers and critical commentary from highly rated journals. Textbooks were identified through a library search for additional material. Reports from the WHO, the World Bank and other reputable sources of factual data and statistics have also been included to provide a comprehensive review. Other websites were purposefully selected to search for relevant guidance and information, such as those provided by the Republic of Uganda and associated websites.

Each research paper was read in detail and critically appraised by applying a quality critical appraisal skills programme (CASP, 2017) tool for qualitative and quantitative studies. This was to ensure that the research process covered in each of the papers was rigorous and that the findings are reliable. The main areas to be identified in each research-based paper were: What are the aims of the research? Is the methodology appropriate? Is the design justified? Is the recruitment strategy explained? Is data collection clear? Is the relationship between researcher and participants considered? Is there ethical approval? Is data analysis rigorous? Are the findings explicit? Is the research transferable or generalisable? Bryman (2017) adds: Is there sufficient data to support its interpretation?

Categories of literature

Three broad categories of literature emerged from the literature search. The first category encompasses a global perspective; the second comprised an international perspective concerned with Africa, and low and middle-income countries; and finally, the third had a Ugandan focus including the impact on nursing. Other terminology is also used in the literature such as ‘developing country’, ‘emerging economies’ and ‘sub-Saharan Africa’. When these general terms were used, Uganda often featured in the research. The literature is also appraised in a chronological sequence to reflect the fast development of computer technology and ICT globally,

in LMIC and Uganda. Finally, Uganda is contextualised within each theme with reference to ICT, nursing and the healthcare workforce.

Initial appraisal of the articles resulted in dividing the papers into primary and secondary themes. Some papers contained several themes so are referenced in several places in the review. The themes are: ICT development; computer literacy; e-learning and online learning; role of libraries; benefits; barriers; policy; culture; and theories. The chapter concludes with a synthesis of the literature reviewed. Chapter three contains a policy review (Pawson *et al.,* 2005) incorporating cultural influences and theoretical perspectives.

Themes identified from the literature

Themes identified from the literature search and used as a framework to organise this critical review are:

- Computer technology and ICT development. This first theme provides a comprehensive background to developments in computer technology, ICT and internet access in the context of nursing, health workers and health services for CPD, education, training and other healthcare applications.
- Computer literacy. This second theme reviews computer literacy skills for nurses, health workers and doctors, and the utilisation of computer technology for training and CPD.
- E-learning and online usage – including accessing knowledge and information through e-learning, the availability of online courses and access to them.
- Role of libraries – which play a key role in in supporting CT and ICT development in education.
- Knowledge, attitudes and perceptions leading to successful (or unsuccessful) development of computer utilisation skills.
- Barriers to developing effective computer utilisation skills – including connectivity, cost, capacity and culture.
- Benefits of computer technology and ICT – facilitating online learning and CPD and retention of healthcare workers.

- Policy development as essential for ICT development –developing the infrastructure and investment.
- Culture as a facilitator or barrier to learning, including reading culture and models of national culture applied to ICT adoption.
- Theory of ICT engagement – theories of ICT diffusion, acceptance and adoption.

Table 2.2: Summary of themes identified in the literature search and critiqued in the review

Summary of themes used in review			PERSPECTIVES PLACE AND TIME		
THEMES	1	Computer technology and ICT development	GLOBAL	LMIC/AFRICA	UGANDA
	2	Computer literacy			
	3	E-learning and online usage			
	4	Role of libraries			
	5	Knowledge, attitudes and perceptions			
	6	Barriers			
	7	Benefits			
	8	Policy			
	9	Culture			
	10	Theories			

Background to computer technology and ICT development and internet access for CPD, education and training, nursing and other healthcare applications

Introduction

Information and communication technologies are defined as "technologies that provide access to information through telecommunications… this includes the internet, wireless networks, cell phones, and other communication mediums" (Christensson, 2010). In broad terms, that includes a range of devices such as computers, radio, television, mobile phones and satellite systems, and their applications such as mass communication through the internet. In healthcare, the

opportunities ICT offers are numerous such as online diagnostics, video conferencing, systems management, electronic patient records, education and research. The term can be applied to education through e-learning and accessing online information for research and development purposes (Ajuwon & Rhine, 2008). Accessing and utilising computer technology in healthcare and CPD in nursing are aspects that will be considered in this section of the review.

Global perspectives

The WHO (WHO, 2006, 2015) stated that ICT has the potential to improve health and healthcare globally, and previously to the achievement of the Millennium Development Goals (MDGs), through education of the workforce, computerising patient record systems, and increasing communication between the workforce and patients through ICT and computer technology. In addition, Joynes' (2011) report entitled *Distance Learning for Health* identifies the shortage of health workers, weak management, and lack of technical knowledge and supervision, especially in sub-Saharan Africa, to constraining factors in the provision of health services and delivery of MDGs. A global review of distance learning designed for the medical workforce in LMIC is considered later in this review.

However, the more recent report from the WHO (2015) confirms a continuing deficit in technology transfer to LMIC resulting in gaps in health systems, policy making and its implementation. The report emphasises that research and increased research funding are vital for developing technology, systems and services. These would lead to greater access to knowledge via the internet and allow the achievement of universal health coverage and the SDGs. The most recent global survey on e-health conducted by the WHO Global Observatory (2016) considers eight health indicators that support universal health coverage and includes e-learning for training of health professionals. The aim is to bring health services to remote populations throughout the world. The indicators listed include at what level e-health services are established in 125 countries, including Uganda. Some key points from the report on Uganda include that a national e-health policy was established in 2012, and that capacity building in e-health for health professions to date has covered up to 25% of the workforce. E-learning programmes for nursing

and midwifery are reportedly established, although the extent of the coverage is not indicated.

LMIC

In LMIC access to health information by healthcare workers is rapidly increasing as internet access is expanding. For example, the Health Internet Network Access to Research Initiative (HINARI) was developed by the United Nations (UN) and launched by the WHO in 2002 in collaboration with various e-journals, publishers and benefactors such as the World Bank (Bukachi & Pakenham-Walsh, 2009). To date, the service is now available to over 100 countries and is either freely available or at low cost depending on the selection criteria; these include Gross National Income (GNI) or if the country is on the UN's least developed country list, on which Uganda is included (WHO, 2017). This is important for improving health and healthcare through education of the workforce.

Sub-Saharan Africa has experienced many barriers to ICT implementation and access. These are summarised as the Four Cs: connectivity, cost, capacity and culture (Bukachi, 2009). Issues such as download speeds, economic investment, computer hardware maintenance and electricity supply all greatly hamper ease of use. In addition, lack of exposure to ICT and computer technology by healthcare workers, and the prospect of moving away from a traditional oral culture to a reading culture, are still factors that may impede change. Bukachi (2009) concludes that a better understanding of local needs, improved training and investment in ICT are required. Acharya (2007) considers that the cost of new technologies and capacity building should be combined with investment in public health and healthcare. He argues that a strategic approach should be taken that addresses the technological capacity required to meet local health needs through training programmes and the development of government policies. This is an important consideration for successful implementation, and in line with the national information technology policy for Uganda (MICT, 2012).

By 2014, the level of internet access in developing countries had increased significantly, but they still experience difficulties including costs and lack of

investment (Ejiaku, 2014). Many developing countries depend on foreign aid to develop IT infrastructure, but often this has not been adapted to meet local need, rather imposing a western model, so difficulties and delays arise. The overarching difficulties lie in lack of broadband infrastructure and skilled IT professionals in developing countries. Rolling out skills training to healthcare professionals, for example, is essential for progress and must be supported by policy development to drive forward economic and social change (Bukach, 2009; Ejiaku, 2014).

Uganda

An early study conducted in 2003 by Omona and Ikoja-Odongo (2006) used case studies and qualitative questionnaires to examine the application of ICT in the health sector in Uganda. The study aimed to establish how many working computers were available in each institution in the study, the cost of access, the level of ICT competence, quality of ICT services, telemedicine, ICT policy and dissemination of health information. In agreement with other studies in sub-Saharan Africa undertaken around this time, the findings illustrate an underdeveloped ICT infrastructure, dial-up modems, narrow bandwidth, associated high costs and a high rate of computer illiteracy (Ajuwon *et al.,* 2008; Bukachi, 2009; Omona *et al.,* 2006). The study concludes that a combination of factors will be required to support future development of information needs within health services, including changes in attitude towards ICT implementation, development of ICT infrastructure, skills training and investment. Much of the ICT development at this time depended on donors and economic empowerment of the population, rather than government investment.

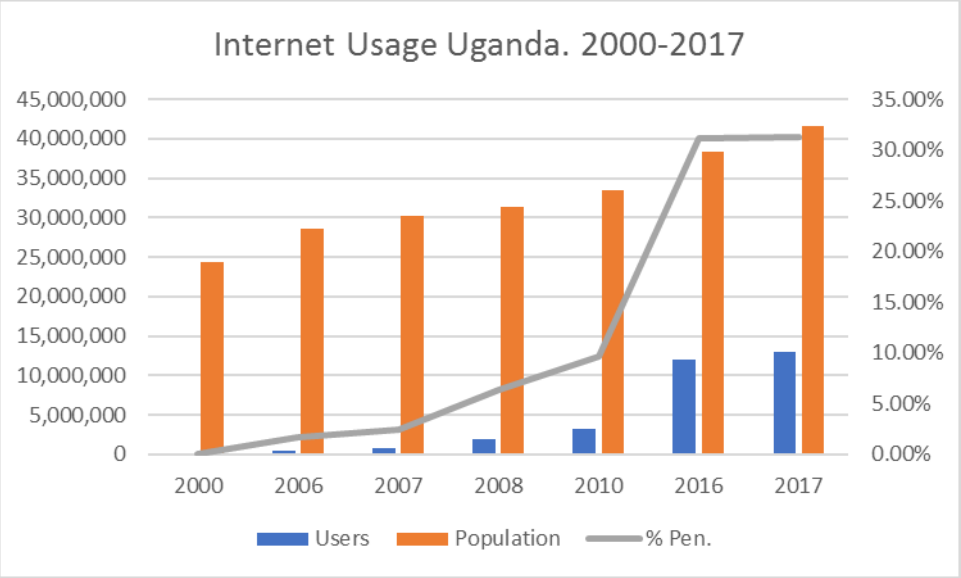
Evidence from the study by Tabo-Olok *et al*. (Tabo-Olok, Yagos, & Ovuga, 2015), conducted in 2015 in Northern Uganda, demonstrates how ICT has developed in the decade since the study by Omona *et al*. (2006). This was a cross-sectional survey using questionnaires to collect data from 68 doctors, 48% of whom accessed a computer in the workplace. It also considered the attitudes of doctors towards e-health use and how ICT can support health services in various ways including health surveillance, health systems management, decision making and equity of healthcare delivery. The study also suggested that healthcare professionals are not

sufficiently exposed to ICT, resulting in limited knowledge and skills. The study concludes that "the level of ICT skills is the most important predictor of ICT use by healthcare professionals" (Tabo-Olok *et al.,* 2015, p.7).

This study also complements the findings of Bada *et al*. (2016) and Yagos *et al*. (2017) that ICT supports health services delivery. However, despite the continuing lack of infrastructure in remote areas of Uganda, attitudes towards ICT and its benefits are nevertheless considered positive and should support future implementation.

Uganda is calculated to have 14.7% of internet users in a population of over 37.5 million (WHO, 2016). However, a report by Internet World Statistics (IWS, 2016) estimates that 28.6% of the population are internet users. This indicates a wide variation in data collection and reporting. However, what is clear is the rapid increase in internet penetration, from 9.6% in 2010 at the beginning of this study to 31.3% in 2017 (see Figure 2.1). A review by IWS in 2017 states that Uganda is one of the first countries in Africa to gain full internet connectivity with many service providers. Major cities are well served by telecommunication and internet services, but rural areas still require major development funding to realise these developments in infrastructures. However, there is a rapid increase in mobile phone users in all areas of Uganda and the introduction of 3G or third generation (IWS, 2017) wireless, which is a higher level of wireless mobile technology, will enable greater internet access without the need for computer terminals or laptops. The following graph is redrawn to illustrate the increase in internet users, internet penetration and population statistics from 2000 to 2017:

Figure 2.1: Uganda internet usage and population statistics



(*Source*: United Nations Department of Economic and Social Affairs, cited in Internet World Statistics, 2017)

Ugandan policies that have influenced technological development including ICT in nursing development, healthcare education and cultural influences are reviewed later in the chapter.

Computer technology and ICT development – incorporating computer literacy skills for nurses, healthcare workers and doctors

Global perspectives

The first part of the literature appraised in this section identifies the opportunities afforded to health and nursing through ICT advances and globalisation, and traces the developments chronologically to emphasise the pace of change from global and Ugandan perspectives. Abbott and Coenen (2008) suggest that learning from what has already been achieved will assist nursing leaders to plan for the future such as combating the 'technological apartheid', or inequality of access to technology, that exists across the world and to develop applications for health and nursing. For ICT growth in developing countries, they emphasise the importance of adapting to the local and cultural context whilst acknowledging barriers to the application and progress of ICT. In their review, they discuss the work of the African Medical and Research Foundation (AMREF) in Uganda; this is an organisation that has increased the level of nursing education in Kenya from diploma to degree level over a five-

year period, whose curriculum is facilitated by ICT engagement. This was followed through to reveal that AMREF Health Africa, in 2017, offers e-learning courses for midwives in Uganda and nurses and healthcare workers across all of Africa (AMREF, 2017). Additionally, Abbott and Coenen (2008) and Lupianez-Villanueva *et al*. (2011) determine that nurses must be proactive in problem solving activities and intellectual thinking to promote the integration of ICT in nursing practice.

ICT has been a feature of nursing practice since the 1980s in the US, Europe and the western world. Lupianez-Villanueva, Hardy, Torrent and Ficapal (2011) undertook an online survey and statistical analysis of over 13,000 nurses in Barcelona, Spain in 2006 to determine nurses' utilisation of ICT and the internet, and to identify factors that can enhance or inhibit their use in nursing. The results revealed that most nurses are utilising the internet in their work, but the nurses fell into two categories. A minority (4.58%) of nurses valued ICT and the internet, saying it forms a major part of their practice. They are referred to as 'integrated nurses' as they were more likely to use the internet for research purposes and working with patients. The benefits identified were enhancing nursing practice, helping to develop the nurse-patient relationship, and communication. The second category (95.42%) of 'non-integrated nurses' placed less emphasis on ICT and the internet and utilised it less frequently. Various reasons were cited for this, such as more importance being placed at a strategic level on medical rather than nursing educational needs for ICT training. Lack of time, lack of nursing information, poor access to computers and unreliable internet connections were also reasons given. There are similarities in this to While and Dewsbury's literature review (2011) which outlines the development of ICT and the interface with nursing practice.

While and Dewsbury (2011) specifically discuss nurses' role in telehealth and how nursing practice is anticipated to change in the future. The paper focuses on a US and UK perspective, but anticipates future possibilities for the nursing profession which have far reaching implications. The impact is expected to be less face-to-face consultations by nurses, and more physically remote consultations and 'virtual visits' through the internet. This will also change the nurses' skill set over time to feature more developed ICT and communication skills. This has implications for

training and identifies that nurses need to engage more fully with ICT developments to realise these changes. Different nursing job roles and levels of autonomy were highlighted by While and Dewsbury (2011) and Lupianez-Villanueva *et al*. (2011) as drivers for enhanced ICT skills and application requirements. Abbott and Coenen (2008) state that ICT skills are essential and an opportunity for every nurse as e-health expands, and that strong nursing leadership is required to make it happen.

LMIC and sub-Saharan Africa

Ajuwon and Rhine (2008) distributed a questionnaire to 121 health information professionals in sub-Saharan Africa to assess internet access, use of electronic resources and level of ICT training. The majority (68%) of respondents lived in major cities where internet access is superior to rural areas. 85% had internet access at work, and 15% did not. More than 68% claimed that internet speed and reliability at work was good or very good, while only 15% had access at home and 40% also used internet cafes. Experiences of searching for online documents was 88% for work purposes and 40% for personal use: Google, the WHO and HINARI were frequently searched for information. However, 70% had not received any formal training and 74% claimed to be self-taught in using Word, email and the internet, including searching databases (62%) and downloading from e.g. HINARI (45%). Attending training courses was difficult due to cost, pressure of work, absence of nearby courses, and personal or family commitments. 87% of the participants claimed to require further training: the majority would prefer face-to-face and hands-on learning, rather than training online and via email. Ajuwon *et al.* (2008) conclude that regular training in ICT skills is needed for health information specialists, and health related information should be freely available to all health workers. However, further investment in infrastructure and training is required to achieve ICT expansion in line with WHO (2015) recommendations.

Uganda

An empirical research survey, undertaken by Ali, Haolader and Muhammad in 2013, examined the integration of ICT with classroom teaching and factors that influenced its use, including some of the barriers militating against it. They identify that ICT in

education is a subject itself, and by learning ICT skills students can apply them in everyday life as well as professionally. The skills of the teacher must also be developed, and their attitudes, competence and confidence can impact positively or negatively on integration of ICT into teaching and learning, and ultimately on student learning. To be successful, ICT must be accessible, available and well maintained. Alternatively, if technical support skills are not available to support education, then this will compromise the potential for teaching and learning: "Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of ICT" (Ali *et al.,* 2013, p.4063).

Although their study focuses on students in higher education and general education, it can be generalised and applied to education and training of nursing, medical and healthcare workers who also attend higher education institutions. The recommendations from the survey include implementing new forms of CPD in the workplace as part of the culture of lifelong learning, and investment in and provision of more ICT tools in higher education. The study by Muliira *et al*. (2012) examines the engagement of nurses in lifelong learning, which is influenced by their level of education and development of computer skills. It also recommends tailoring of CPD programmes to meet specific needs. Therefore, there are similarities in the analysis and results of both research studies (Ali *et al.,* 2013; Muliira *et al.,* 2012).

A study of nurses by Muliira, Etyang, Muliira and Kizza (2012) on lifelong learning was undertaken in a hospital in Kampala, Uganda. Of the 800 nurses, half were randomly selected to complete a self-administered questionnaire. 200 questionnaires were returned. The questionnaires consisted of closed and open-ended questions using the Jefferson Scale of Physician Lifelong Learning, and results were analysed using SPSS statistical software. The findings indicated that over 50% of the nurses were engaged in some form of lifelong learning; reasons for this included achieving promotion or a new job, staying informed and gaining new skills. The main barriers were heavy workload, lack of access to a library and lack of computer skills (56%). Strategies for promoting lifelong learning include improved library access, study leave, scholarships, training in computer skills and the provision of CPD events. The level of education, e.g. higher education, is also linked

to nurses' commitment to lifelong learning and development of computer skills, literature searching, ability to read scientific papers and critical thinking skills. Degree-holding nurses were therefore more likely to possess these skills than associate nurses. Increasing age and greater clinical experience are also factors militating against lifelong learning. In Uganda, these factors should be taken in account when developing CPD programmes, and incentives may be offered to encourage participation such as provision of scholarships, study leave and 'electronic tools'.

A study by Mugisha *et al*. (2009) specifically examined CPD by promoting the use of ICT among health professionals, including doctors and senior nurses, in rural Uganda. A semi-structured questionnaire was initially completed by health workers to assess CPD needs on three rural hospital sites. The pilot study identified that CPD was deemed to be 'inadequate', 'failing to meet demand' or 'not properly coordinated'. The project aims were to develop CPD through improved availability of ICT, to promote utilisation of CPD through ICT, and for rural health professionals to determine their own CPD needs. The CPD programmes were revitalised and reorganised in each of the hospitals by providing ICT equipment, including computers, projectors, CDs and other office equipment, and training of staff in basic ICT skills. An evaluation was undertaken after three years using focus groups, observation and records, and found evidence of improvement in CPD participation on all sites. Attendance at weekly CPD sessions by doctors and senior nurses had increased from 35% to 80%, and the delivery of CPD sessions changed to more tailored discussion groups adapted to different categories of staff and their specific needs. In addition, there was increased use of electronic materials, ICT equipment, internet searches, information sharing and use of textbooks, initiating a positive reading culture. One of the most encouraging results from the project was the interest shown by hospitals outside the project, and their involvement in both teaching CPD and attending sessions. A further benefit was the increased personal ownership of computers, CD-ROMs, memory sticks, digital cameras and mobile phones by health workers because of training and increased self-directed learning. Finally, the CPD programme has impacted on increased employee motivation,

information sharing and retention of staff. These final points were also demonstrated by Yagos *et al*. (2017) who conclude that ICT is a factor in the retention of rural health workers, information sharing, and motivation to stay and work in a rural location.

A qualitative study undertaken by Yagos, Tabo-Olok and Ovuga (2017) in Northern Uganda sought to explore whether the availability of ICT and its benefits influenced retention. This was a small study consisting of 11 participants including nurses, doctors and others health workers. Data was collected from semi-structured interviews. Eight of the participants sometimes used computers and six reported basic skills, and some had never used a computer before. Despite this lack of knowledge and limited utilisation, participants had a positive attitude towards the benefits of ICT in their location such as reduced isolation through increased communication and improved reading culture. Other benefits were the potential for e-referral, teleconsultation, electronic medical records, accessing knowledge of disease and drug management, and access to training. The use of mobile phones was also cited as a benefit.

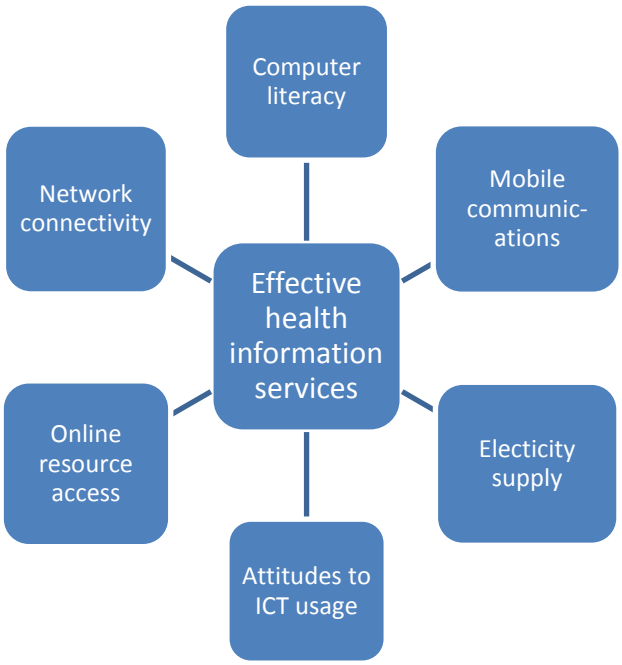
The studies by Bukachi *et al*. (2009) and Yagos *et al*. (2013) also found there was limited access to ICT, lack of exposure to ICT and underdeveloped ICT skills. Although Mugisha (2009) and Yagos *et al*. (2013) indicated that ICT improves the retention of health workers, this must be supported by investment in ICT equipment and training (WHO, 2015).

A study undertaken by Bada, Gorretti, Brian and Josephine (2016) considered how ICT can enhance the delivery of health services in research carried out in thirteen hospitals and health facilities in Uganda. A cross-sectional survey design was used and data was collected via individual questionnaires from 167 doctors, nurses, laboratory technicians and midwives who were randomly selected from over 3500 medical staff. A quantitative analysis of the data was completed using SPSS software. The findings show that over 50% of medical personnel are computer literate with over 50% using internet and email services; in contrast, a low mobile phone usage was reported. The research also demonstrated that it was mainly top

managers who had access to computers, while other health workers' access was limited. The authors of this research generated a conceptual framework suggesting that six specific factors should be present: computer literacy among all staff; access to computers and internet connectivity, though this is only possible with sufficient investment in bandwidth; access to quality online information; mobile technology; a reliable electricity supply; and positive attitudes of health workers to ICT are all prerequisites for successful ICT based service delivery.

The framework is illustrated as follows:

Figure 2.2: Conceptual framework for ICT-based service delivery in health institutions



(*Source*: Redrawn from Bada *et al.,* 2016)

The findings are similar to other research in this review: that ICT usage depends on computer literacy and ICT training, whether the purpose is for learning or enhancing health services (Ali *et al.,* 2013; Mugisha, 2009; Muliira *et al.,* 2012; Tabo-Olak *et al.,* 2015; While *et al.,* 2011). As previously mentioned, Bukachi *et al*. (2009) summarise four challenges to implementation of ICT – connectivity, cost, capacity and culture – which broadly align with the Bada *et al*. (2016) conceptual framework.

E-learning and online usage

Whereas previous papers have considered training, computer literacy and CPD programmes for health workers, the following papers look at accessing knowledge and information through e-learning and the internet in more detail.

Global perspectives

Joynes (2011) undertook a global review of distance learning for postgraduate qualification training programmes for health workers including LMIC and Uganda. This work was funded by London International Development Centre (LIDC) and contributed to the study undertaken by Chio (2012). Again, one of the overwhelming challenges to distance learning in Uganda is that access to the internet in health workers' homes is minimal and the cost is generally prohibitive. University courses in Uganda incorporating distance learning also come at a cost that can be prohibitive. Globally, there is a proliferation of distance learning initiatives for training health workers, but they are not all accessible due to poor internet connections in rural areas, or as a consequence of policy or unavailability of study leave. In turn this may impact on staff retention and reluctance to work in remote rural areas with a lack of learning opportunities.

LMIC

ICT as a medium for education has been established for many years and is becoming more sophisticated as technology advances. There are many ways in which ICT can be integrated with health worker and nursing education, such as in full time education to supplement and enhance learning as part of a blended learning approach (Ali *et al.,* 2013; Chio, 2012; Frehywot *et al.,* 2013; Kamanja, 2007), to support CPD (Mugisha, 2009; Muliira *et al.,* 2012), or to replace traditional teaching altogether through the provision of complete online courses, leading to professional qualifications on a national or global scale (Abbott & Coenen, 2008; The Open University, 2017).

Kamanja (2007) examined the current extent and availability of open and distance learning, which is hailed as an answer to meeting the demand for higher education where the needs can no longer be met by traditional teaching methods. The study

is a review of the literature concerning distance learning in Africa, the learning environment, how learners use the internet and challenges to the method. Learners have preferences for different types of learning and need to be prepared for online or distance learning, especially as, for many, it will be a new type of learning experience. Distance and online learning are well established at the University of South Africa, but at the time of this research it provides offline resources to students including written guides, CDs, DVDs and videos to be used with ICT, rather than internet based material. Not all students have access to the internet, and time to be able to access materials online is costly; and they may need to travel long distances to university centres at additional personal cost to access e.g. video conferencing and IT skills training. The review also emphasises that successful use of technology-based education depends on teams of people (for example, to prepare study/online materials), attitudes, level of ICT skills, and enthusiasm of lecturers and students. At this time, there were various constraints on the system including no or limited supply of electricity, ability to access the university portal or intranet, cost, bandwidth and level of computer skills. More recently published papers also acknowledge similar constraints such as cost, connectivity, capacity and culture (Bada *et al.,* 2016; Bukachi, 2009; Chio, 2012).

Nabwera, Purnell and Bates (2008), following a review of the literature, developed a quality assurance handbook to help improve higher education courses in Africa, including Uganda. It was designed to provide information to enable institutions to design and deliver professional development courses that meet international standards and contribute to capacity building needs of healthcare workforces. The handbook was piloted in Ghana and then made freely available from the Liverpool School of Tropical Medicine, which provides some of the offsite courses. The handbook specifically recommends that students have access to ICT and well-resourced libraries and have training in literature searching and critical appraisal skills, along with free access to internet e-journals e.g. HINARI. The absence of these requirements may well inhibit uptake of such courses.

LMIC including Uganda

Chio (2012) looked at the provision of online in-service training for health professionals in low-resources settings worldwide, including Africa and Uganda, to meet the different CPD needs of doctors and nurses who are in leadership and management positions. The skills and knowledge needs of those in leadership and management positions are distinct from those required in the clinical field, hence the need for a targeted 'team' approach rather than a blanket approach to all health professionals. Programmes were funded by the United States Agency for International Development – Management Sciences for Health (MSH) and were delivered across 77 LMIC countries to 4000 health professionals.

Chio (2012) acknowledges the problems that face development of e-learning programmes in LMIC such as variable internet connectivity, electricity supply, and availability of computers. However, despite these problems, a blended learning approach combining face-to-face teaching and computer-based approaches can still be effectively delivered where resources are limited or unreliable. Three criteria must be met to ensure improved performance: they must be accessible, encourage a team approach to learning, and permit practical application of learning through action plans following the programme. The online programmes in the study incorporated workbooks, offline reading, meetings between participants in workplaces, emails, telephone communication and ongoing support from facilitators. The programme was delivered in 2010 to five country teams with 64 participants in Uganda, Ethiopia, Kenya, Nigeria and Tanzania. When followed up, teams were making progress on delivering their action plans to improve monitoring and evaluating health systems and service delivery. However, the conclusions drawn from the whole programme acknowledged limited funding for programme follow up, and often when follow up was attempted incomplete or no responses were obtained from participating organisations. Changes in personnel may also be a contributing factor. The paper emphasises that continuing development and improvement in internet penetration and connectivity in LMIC will ultimately impact on accessibility and uptake of such programmes.

A systematic literature review across LMIC of e-learning in medical education was undertaken by Frehywot *et al*. (2013). The term was further clarified by definitions of alternative terminology such as blended learning, computer assisted learning, distance learning and online learning. Over 60% of the articles reviewed were based on experiences in medical education, while approximately 13% concerned nursing. A summary of findings correlates with other studies that confirm that increasing access to education through ICT was the main reason for implementation of e-learning or blended learning, and that it provides greater opportunities for all health workers including doctors, nurses and others. Despite limited access to computers and the internet, e-learning and blended learning approaches using mobile technology have been developed in some rural areas. E-learning is also useful in developing capacity, providing professional development and retention of health workers (Frehywot *et al*., 2013; Yagos *et al.,* 2017).

Again, this study detailed the difficulties in implementing e-learning education programmes. These include infrastructure, limitations in bandwidth, slow speed when downloading, limited access to computers, electrical power unreliability and lack of personnel with ICT skills. In addition, it is very important to be able to adapt programmes to the local country's health and cultural needs. To overcome these factors a clear strategy for institutional support, financial and personnel investments, and ICT expertise is vital to support the infrastructure required for successful implementation. Encouragingly, extraneous factors such as cable networks to increase bandwidths are currently being constructed in East Africa. It has been reported that by 2017 Uganda will have the potential for full internet connectivity (IWS, 2017).

Role of libraries in supporting CPD, CT and ICT development in education

From the literature, there is evidence that libraries play a key role in supporting CPD, through online access to information for nurses, midwives and other healthcare workers (Hosey, Kalua, & Voss, 2016; Mlay, Sabi, Tsuma, & Langmia, 2015; Okello-Obura & Kigongo-Bukenya, 2011; Omona & Ikoja-Odongo, 2006; Smith *et al.,* 2007; Tibenderana, Ogao, & Wokadala, 2008). Tibenderana *et al*. (2010) also

comment that libraries are 'hybrid' with a combination of computer networks and traditional library facilities. In the remainder of this section, these six journal articles are considered, with key points summarised to illustrate the development and importance of access to information through both online libraries and online access from libraries. All articles include Uganda. Two studies include other countries in Africa and four are undertaken solely in Uganda. They will be appraised in chronological order.

LMIC

A study by Smith *et al*. (2007) examined access to 'electronic health knowledge' including medical literature on the internet. The study was undertaken in Cameroon, Nigeria, Tanzania, Uganda and The Gambia. In common with other research (Bukachi *et al.,* 2009), it found that increasing internet penetration in sub-Saharan Africa is enabling greater access to medical literature online. Prohibitive factors are the cost of access such as online subscriptions to journals, as well as other technical issues such as power supply and availability of computers. However, an initiative by the WHO (2002), the HINARI programme, allows free access to a full range of journals via academic, medical and government institutions in low and middle-income countries. At the time there was no evidence of any research taking place in Africa to explore the ease of access and ability to retrieve online journal articles. A descriptive study using questionnaires and semi-structured interviews was undertaken in four teaching hospitals in four countries plus The Gambia, with a total of 333 respondents. The results confirmed that in four countries, although 66% of doctors had accessed information from the internet in the previous week, textbooks were still their main source of information. Access was higher in The Gambia with almost all accessing the internet in the previous week. For some respondents, internet cafes were their main access point to the internet. Results indicated that there was limited awareness of the HINARI initiative (Bukachi *et al.,* 2009; WHO, 2002). Where it was accessed, there were difficulties in obtaining passwords and logging in, even in libraries. The study concluded that textbooks were still an important resource, and a strong organisational commitment was required to improve internet access.

Much progress was made in the next decade to develop online resources specifically for nurses and midwives. Hosey *et al*. (2016) reported on the evaluation of a project to *Establish an Online CPD Library for Nurses and Midwives in East, Central and Southern Africa.* The study surveyed nursing and midwifery leaders in 17 countries, including Uganda, to identify CPD needs and the type of content needed in an online CPD library. An anonymous survey questionnaire was circulated by email to the selected leaders to establish what was already being done in the region. Important topics and available resources that could be shared via the library such as internet links, downloads and use of USB drives or memory sticks were suggested. In addition, an online review of internationally available materials was conducted for possible inclusion in the library. Six countries, including Uganda, had new CPD programmes about to start, although no details were available in the study. Challenges in establishing CPD programmes were acknowledged, including lack of understanding of the requirements, limited resources and cost. In addition, nursing shortages, being released to attend and payment for CPD by nurses were areas to be addressed. Uganda specifically stated that CPD frameworks should be shared among East, Central and Southern Africa (ECSA) states, but in reality, few countries had any resources to share. Of the 23 CPD topic areas identified for nursing development in the survey, it was noted that technical and computer skills were fifth from the bottom of the list and specified as being of interest by less than 25% of respondents. It appears that the nursing leaders were more concerned with nursing topics, rather than the way in which nurses accessed the topic information. Barriers that could limit access by nurses to computer technology for CPD included slow or limited internet access and availability of library and computer resources. Mobile and electronic learning were low on the list. When specifically asked about delivery of training modules in the online CPD library, 65% of the respondents preferred web-based resources, 81% PDF online materials, 62% flash drives, 57% printed material, and 81% PowerPoint slides. There have been delays in launching the online CPD library and various providers have been appointed to develop the website. It was eventually re-launched in South Africa in July 2015. Its continuation can only be secured with ongoing funding, and support from benefiting nations and ECSA College of Nursing where the online CPD library is located (ECSACON, 2017).

Uganda

Omona *et al*. (2006) undertook a study to assess the "application of ICT in health information access and dissemination in Uganda". After independence in 1962, there was a huge investment in resources, mostly from foreign donors. Following this, during the 1970s onwards, funding was reduced for medical journals and textbooks due to the political regime at the time (Okello-Obura, 2011). The HINARI programme, launched by the WHO in 2002, provides free access to over 3000 online journals, but now connectivity is a problem reducing the potential for unrestricted access. It is also suggested that with reduced access to medical information, health practitioners cannot keep up with the pace of change, thus impacting on the quality of health services provision.

In the Omona *et al.* (2006) study, librarians and library users from health institutions were selected to complete questionnaires, and six administrators and two government officials all involved in ICT activity were interviewed. There were several aspects of enquiry in this study. The number of working computers capable of internet access or reading CD-ROMs was found to be minimal with very few located in libraries. Two libraries in the study had no computers. More were in departments, for example in computer laboratories; many of these had been donated by European nations. The librarians who answered the questionnaire blamed decision makers for not prioritising ICT in libraries for information access, hence the low number of computers. Another line of enquiry was ICT knowledge and skills of users and availability of ICT training. Although 65% considered themselves to be computer literate, 35% lacked basic competence. In addition, 54% said they did not require help in using ICT, whereas 46% did. Of those respondents who needed assistance, some did not have access to ICT equipment or training or had never used a computer before. Despite the variability in skills, levels of support and training, all respondents understood the transformative qualities of ICT to disseminate health information, research and learning. As also revealed in other studies, lack of ICT infrastructure, subscriptions and low bandwidth escalates the cost of internet access, the majority of which is provided by donors. This, coupled

with low levels of computer literacy, militate against speedy progress. A quote from the conclusion of this study is very pertinent to future ICT development:

> …the availability of ICT alone will not make Uganda achieve the goal of providing 'information for all' in the health sector unless it is accompanied by the right mix of changes in attitudes, skills development, ICT infrastructure development and above all, economic empowerment of the majority of the population who are poor and live on less than 1 dollar a day. (Omona & Ikoja-Odongo, 2006, p.51)

The Tibenderana *et al*. (2010) study looked at the introduction of computers and ICT to libraries in Uganda. The study obtained data from 445 questionnaires distributed across eight universities. The study aimed to test a research model of acceptance and use of ICT services. Responses indicated that 57% of respondents owned a computer or laptop, and 51% claimed to have computer skills (49% did not); only 50% of respondents reported availability of ICT services and computers in their universities at all. It was also observed that even though services were offered, the 'end-users' were not always aware of them. The conclusions indicated that e-library usage is influenced by relevance, social influence and anticipated benefits from the service and overall a positive acceptance of e-library services. This is also linked to attitudes towards computer services which may influence the mode of introduction.

A literature review by Okello-Obura (2011) considered education and training of librarians in library information science (LIS) in Uganda. This is an important factor in establishing, equipping and staffing of e-libraries, and in provision of e-library services and facilitation of ICT training for all university students. However, the literature revealed that many LIS students are themselves 'information illiterate' and need to adapt to technological change by learning to use computers. This is considered to be due to a poor reading culture and lack of libraries in schools that is characteristic of the education system. At the time of the review, there remain a limited number of functioning computers and slow internet access in LIS university courses. Therefore, the interface needs to be addressed between university courses for LIS professionals, their knowledge and skills in ICT, and increased investment in ICT infrastructure. In addition, courses on information literacy and ICT should be

available to all students, including health professionals and teaching staff, to equip them to integrate with growth in the global health and information economies.

Knowledge, attitudes and perceptions influencing development of computer utilisation skills

Nine of the articles refer to knowledge, attitudes and perceptions that influence the successful development of computer utilisation skills and ICT.

Global

Wilkinson *et al*. (2009) undertook an integrative review of "Measurements of ICT experience and attitudes to e-learning of students in healthcare professions." The study examined tools that measured the attitudes and experience of healthcare students, including nurses, towards ICT skills and the use of computers and the internet for education. The worldwide literature reviewed in this study, including literature from the UK, US, Europe, Asia and Australia, confirmed that students are not keeping up with the pace of change or the required level of information literacy and ICT competence expected at the point of registration. Anxiety was identified as a factor that influences attitude and performance, and more practical experience was found to lessen anxiety regardless of whether they were associate or degree students. Several measuring instruments were tested for validity and reliability, and a thorough review was undertaken to consider the psychometric properties of such instruments, their value and application. It was concluded that many tools were out of date and that the quality of instruments was variable: more research was required to establish a valid tool. The following study by Topkaya *et al*. (2014) also found attitudes to be significant in computer literacy skills.

A cross-sectional descriptive study by Topkaya and Kaya (2014) explored "Nurses' computer literacy and attitudes towards the use of computers in healthcare." Data was collected using validated tools: "Multicomponent Assessment of Computer Literacy", developed in 1990, and "Pretest for Attitudes Towards Computers in Health Care Assessment Scale (PATCH)", whose second version was published in 2007. Both scales were deemed to be valid and reliable and were translated for application in Turkey. It should be noted that neither of these tests was reviewed

by Wilkinson *et al*. (2009). 688 nurses from two hospitals in Turkey completed the survey questionnaire. SPSS was used to statistically analyse the data. Overall results confirmed there was a positive correlation between nurses' computer literacy skills and attitudes towards the use of computers in healthcare. They concluded that training in computer skills is vital, feeds into engendering a positive attitude and contributes to lifelong learning.

LMIC/Africa

A study by Kyalo and Hopkins (2013) explores the attitudes to and use of online learning for professional development of lecturers in several medical colleges in Kenya. A cross-sectional mixed methods survey used questionnaires and focus groups. 120 questionnaires were completed, 48% by nurses. Results from questionnaires confirmed that 68% of the lecturers had not engaged in online learning and only 30% had done so in the past. The majority (73%) stated they expected to participate in online learning soon. The majority of lecturers also reported having basic or adequate computer skills were accessing the internet fairly regularly. Results showed that the higher the perceived usefulness, such as enhancing job performance, the more likely people are to adopt it. A negative perception was that qualifications obtained online were not necessarily recognised. However, from interviews with senior institution staff, online courses were said to be equally valued even though they were viewed as cheaper alternatives to face-to-face learning. It was also considered a way to increase the number of staff obtaining CPD with limited budgets.

The study also sought to test hypotheses and concluded: firstly, there was no association between online engagement in urban or rural locations, even though differences in infrastructure may cause access problems; secondly, there was an association between online learning and level of self-assessed computer skills; thirdly, there was an association between years of experience and online learning, but this may be linked to more years of exposure to online learning; fourthly, there was no association between qualifications and participation in online learning; and fifthly, involvement in online learning is associated with a greater positive attitude.

Research by Topkaya and Kaya (2014) also found that computer literacy skills are linked to a positive attitude. Other studies were at variance with results from Kyalo and Hopkins' (2013) study, including Sukums (2014) who found that people with a college certificate were more likely to be computer literate than those without, and that younger respondents were more likely to have computer skills despite limited exposure compared with older professionals, who even though they were more experienced tended to be computer illiterate. The Sukums research covered several countries, and each bore different results; this was dependent on exposure to computers and ICT. In contrast to Ghana and Tanzania, Kenya has better developed infrastructure with the prospect of reduced costs of ICT services (Kyalo, 2013).

Sukums *et al*. (2014) reported on their assessment of health workers' knowledge of and attitudes towards computer applications in rural health facilities in Ghana and Tanzania. A cross-sectional mixed methods study was conducted using questionnaires, semi-structured interviews and focus groups to ascertain computer knowledge, experience and attitudes towards using an electronic clinical decision-making support system (CDSS). Before the system was introduced, a baseline assessment was undertaken to determine the knowledge and attitudes of health workers towards computer applications, and their previous training and experience. Health workers included clinicians, nurses and support staff. Quantitative data was analysed using SPSS, attitude scales were deemed reliable and qualitative data was thematically analysed. Of 108 respondents, 28% had computer training prior to the project which may have lasted one or two days and covered common software e.g. Word and Excel, plus internet and email training. Some had obtained no or limited hands-on experience since receiving training several years before. 59% had never used computers prior to the project and 43% confessed to being computer illiterate. Some had only brief exposure to computers or had forgotten anything learned in the past. Some used mobile phones for access to the internet and email. Interestingly, 25% of nurses, 7% of medical and 10% of other staff rated their computer knowledge as basic. Most of the 'other' staff group were also mainly computer illiterate. 26% of those with a college certificate were computer illiterate compared to 89% of unskilled health workers. Other factors were age and

experience, with younger respondents being more likely to have basic computer skills and, despite limited exposure, keen to learn. By contrast, 67% of older professionals with more experience were computer illiterate and more pessimistic about their ability to learn new skills. The number of staff with basic computer skills in Ghana was three times greater than in Tanzania. Those with existing computer skills were more confident about using computers in the future. Most health workers in Ghana did not have computers at work, and none in Tanzania. In conclusion, most of the healthcare workers have had no or limited training and exposure to computers, and respondents from Ghana reported better knowledge and exposure than health workers in Tanzania. Overall, it is suggested in the research that sub-Saharan Africa lags behind the developed world by more than 10 years, but the positive attitudes of the majority (95%) of health workers in the study and a desire to learn computer skills are encouraging for future developments. Finally, the results coupled with triangulation of qualitative and quantitative data suggest the research is generalisable to similar rural areas.

Uganda

Four recent research studies based in Uganda, discussed earlier in the review, included attitudes to using computers in the context of ICT, healthcare, education, training and CPD development. These are summarised to illustrate the findings of each study. However, the extent to which attitudes are considered in each study varied in depth.

Ali *et al*. (2013) reported that attitudes of teachers in higher education are influenced by a variety of factors and the more of these that are present, the greater the impact on students' learning and ICT integration. These include the teacher's ICT competence, experience, level of education and professional development, the level of support (both technical and institutional), and government policy (NDP11, 2015).

Tabo-Olak *et al*. (2015) examined the "knowledge and attitudes of doctors towards e-health use in healthcare delivery in… hospitals in Northern Uganda". These were influenced by their level of ICT skills, which were underdeveloped, rather than their

attitudes towards e-health. The study concluded that most healthcare professionals had positive attitudes towards e-health and technology. They considered that it provided improvements over current practices: it fitted with professional development, provided ease of use, was a proven method, and was easy to observe and learn in the workplace. The Sukums *et al*. (2014) study also concluded that healthcare professionals have positive attitudes towards e-health and ICT in the workplace, even when knowledge, skills and infrastructure may be lacking. The study by Yagos *et al*. (2017) complemented that of Tabo-Olak *et al*. (2015) in that both showed that healthcare workers had positive attitudes towards the benefits of ICT, despite lack of knowledge and skills. Their experiences and perceptions about the use and benefits of ICT were positive.

Bada *et al*. (2016) developed a conceptual framework (see figure 2.2) that suggests a combination of factors that support ICT based service delivery, attitudes to ICT being a major factor. However, they recommend further research in this area.

Barriers to developing effective computer utilisation skills

Of the previously reviewed publications, six refer to barriers to developing effective computer utilisation skills.

Global

Lupianez-Villanueva *et al*. (2001) specifically considered ICT utilisation and factors that may enhance or inhibit the integration of ICT into nursing practice. Factors included lack of time, poor internet access including slow speeds, lack of nursing specific content, and lack of training. Confidentiality was also a concern for about a third of the nurses. The study also found that the type of nurse was a factor in skills development. If they were 'integrated' they were more likely to use the internet and place more importance on research and intellectual aspects of nursing, updating clinical practice and networking. If they were 'non-integrated', they used it in the workplace for nursing care, but placed less emphasis on it and used it less frequently.

LMIC

As previously remarked, Bukachi *et al*. (2009) summarised four barriers (capacity, connectivity, cost and culture) that impact on the ability of nurses and health workers to access ICT and thus develop effective computer utilisation skills. Frehywot *et al*. (2013) described difficulties in establishing e-learning due to inadequate infrastructure, limitations in bandwidth, slow internet speed, limited access to computers, electricity availability and lack of ICT skills. They also noted that cultural factors need to be considered when developing e-learning programmes. Barriers cited by Sukums *et al*. (2014) include lack of exposure, restricted access, insufficient hands-on experience, level of education, limited training and professional experience, and age. And finally, Hosey *et al*. (2016) cite potential barriers to accessing CPD including staff shortages, limited computer technology, lack of individual or institutional motivation, slow and limited internet access, lack of resources such as computers, support, cost, travel distance, not knowing about availability of courses and family commitments.

Uganda

The study by Murilla *et al*. (2012) suggested that level of education was linked to development of computer utilisation skills. Degree nurses were more likely to be committed to life-long learning, development of computer skills, literature searching, reading scientific papers and critical thinking skills; whereas in associate nurses, increased age and more experience indicated less likelihood of engaging in life-long learning. The Yagos *et al*. (2017) study also linked inadequate ICT knowledge and training to implementation and use of ICT in health centres. This was the only study that cited theft of computers as a physical impediment to progress in use of ICT, along with inadequate power supply, cost of access and lack of policies.

Benefits of computer technology and ICT

Three studies specifically considered the benefits of CT and ICT:

LMIC

Facilities, online learning and CPD are seen to enhance job performance and enhancement potential (Kyalo *et al.,* 2013).

Uganda

Maria, Fatuma and Gorretti (2016) specifically looked at the "perceived benefits of technology enhanced learning (TEL) by learners in Uganda", and the use of portable technology such as mobile phones and tablets supported by wireless technology such as 3G and 4G. The study is set in a university with non-health undergraduate students. The benefits of m-learning over traditional computers and laptops are its flexibility and accessibility for students as mobile technology advances. The widespread ownership of mobile phones is also more realistic than access to on site computers. However, the mobile phone is there to support learning and teaching and to complement computer technology, rather than replace it. TEL is less expensive. It is estimated that 42% (at the time of Maria's research) of Ugandans own a cell phone and the proportion is increasing. 90% of the students in the study had smart phones and others had a tablet or laptop. A blended approach was used where students accessed teaching materials, lecture notes and recordings and interacted with other students online to enhance classroom teaching. In the Hosey *et al*. (2016) study involving access to CPD for nurses and midwives in East, Central and Southern Africa, mobile learning was not a preferred method of teaching and learning. The emphasis of this study was access to CPD through the ECSA College of Nursing website; however, as mentioned previously the sustainability of the library of online resources there depends on continuing investment to achieve long-term benefit.

Bada *et al*. (2016) emphasised the benefits of online forums or communities of interest to discuss health scenarios, either for service users or professional exchanges. In patient care it can increase accessibility to information and allow for enhanced communication between professionals and service users. The drawbacks, as stated elsewhere, are unequal access to the internet due to availability, cost and infrastructure. Yagos *et al*. (2017) demonstrated that retention of healthcare

workers in rural areas of Uganda is possible, especially with positive perceptions about the benefits of ICT investment and training.

Policy development as essential for ICT development

LMIC/developing countries

Acharya (2007) reviewed the position of developing countries, and their need to invest in science and technology but not to the disadvantage of healthcare and public health. Acharya suggests a complementary approach to policy making that benefits each sector. Clearly targeted technological development and financial investment, such as enhancement of ICT infrastructure, internet penetration, and knowledge and skills development for health workers, will impact favourably on healthcare. This then enables technological developments that can be applied to improve health such as handheld diagnostic tools for HIV/AIDS, malaria, vaccines and drug delivery (Juma, 2005). Additionally, adjusting to what the market can afford by developing low cost computers and mobile phones will improve accessibility. Each country should therefore choose priorities and develop policies that address technological and healthcare development based on potential for economic growth. Important areas that will support this process are developing the physical infrastructure, including roads, power, water and communication, to facilitate access to healthcare as well as ICT; and integration of research, public health and technology, for instance by coordinating higher education whilst being mindful of the needs of both industry and health. Universities in Uganda are already adopting this approach through university reform (Juma, 2005). Commercialisation and investment in research and development are vital in addition to government investment. This needs to be coupled with protective regulations and clear policy direction.

Ajuwon and Rhine (2008) suggest policies should be targeted at developing the infrastructure and should attract more funding for ICT development. Frehywot *et al*. (2013) maintain that although policies are needed to guide e-learning implementation, others are also needed to improve ICT network security,

bandwidth and data storage, content and knowledge management, intellectual property rights and accessibility.

Ejiaku (2014) undertook a review of technology adoption in emerging economies, and stressed the importance of policy frameworks to guide the development of ICT infrastructure and investment and for IT adoption. He states that policies in most developing countries are ineffective and this has caused delay in acquisition and growth. Resources are a key part which often depend on foreign aid from other countries, industry or charitable organisations. A problem is that often ICT development uses a 'one size fits all' approach, rather than being tailor made to reflect people's needs and cultural idiosyncrasies in developing countries. There have been attempts to create an African Information Infrastructure to guide needs internationally, but without success. In addition, strong leadership and investment are needed to implement policies successfully, and costs should not be prohibitive.

Uganda

Omono *et al*. (2006) interviewed policy makers from the Ministry of Health and identified a national ICT policy that included universal access to all sectors in society, infrastructure development and support for businesses. At the time of that research, only one university in Kampala had an ICT policy and plan that considered future ICT requirements, university infrastructure, action plans for implementation and sustainability. Since that time, the Ministry of Information and Communication Technology, Uganda, has published a national technology policy (MICT, 2012), discussed in chapter three.

The paper by Isabalija *et al*. (2011) is intended to guide policy makers in Uganda in developing national IT policies that promote knowledge sharing and management of telemedicine information systems. At the time of the study, the use of telemedicine had not been embraced, but other evidence suggests that its introduction is a dynamic process. In the hospitals surveyed, there were no policies or guidelines, staff skilled in telemedicine or staff training, and the complement of computers available was not known. Lack of knowledge points to reduced likelihood of adoption of the technology. Respondents suggested solutions to

address implementation, including increased knowledge and training, computer equipment and infrastructure, security and policies. Overall, the level of awareness of telemedicine was very low in healthcare workers. In addition, literature from the study cites low levels of education and literacy and low rates of computer usage as factors preventing adoption. However, Abbott *et al*. (2008) suggested that telenursing or telehealth has tremendous potential for nurses in surveillance of health activities, interventions, drug treatments, sending SMS messages and CPD in Africa and Asia, but strong nursing leadership is needed to achieve this progression in the profession.

In research undertaken by Orem *et al*. (2012), a literature review was initially carried out followed by interviews with 17 policy makers and researchers in Uganda who were involved with health system development. They were asked about facilitating factors and barriers, emerging from the literature review, that influence effective policy making. Most respondents suggested that institutional strengthening, research and partnerships are the most important factors, as had been suggested in the literature review. In addition, respondents commented on the need to develop policymakers in understanding research processes, synthesis and application. The reduction in bureaucracy in policy making was also seen as necessary to hasten processes. This research demonstrates the importance of using evidence in health policy making when making decisions about how to allocate limited resources. Although not specifically mentioned in this article, the principles apply to ICT development in health services.

Preceding the points made by Orem *et al*. (2012), a research paper by Spero *et al*. (2011) emphasised the importance of making decisions based on evidence-based policy making, by examining the introduction of a human resources information system (HRIS). Spero identified that to plan and make decisions about the workforce, policy makers need to capture reliable information, including the enumeration of registered nurses in Uganda. The introduction of the HRIS database by the Ugandan Nursing and Midwifery Council (UNMC) enabled the capture of accurate information and, in addition, it feeds into the planning strategy for the whole of the Ugandan healthcare system. The research revealed that the policy was

developed with key stakeholders to ensure their support, and to devise practical aspects of maintaining confidentiality and sharing and accessing data, for example to verify qualifications. The HRIS provides a comprehensive record of personal details and dates of registration and training, and includes CPD programmes necessary to maintain registration. It also prevents individuals from fraudulently claiming to be a qualified nurse.

Mutatina *et al*. (2017) undertook a scoping review of web-published documents concerning health policy and decision making in Uganda. 265 documents were amassed, and it is intended they act as a future resource and 'one-stop shop' for policy makers where they may obtain information about health systems and health interventions. For policies to be effective, evidence is needed to justify their purpose and this study is supported by literature from low and middle-income countries. On examining the list of policies and guidelines, for example, there is a National Science, Technology and Innovation Plan 2012/2013–2017/2018, and communication strategies in relation to specific disease management and healthcare interventions. Some of these policies will be examined in the next chapter. Ditlopo *et al*. (2011) analysed the implementation of a policy introduced in South Africa to determine its effectiveness by applying Walt and Gilson's policy analysis framework (Walt & Gilson *et al*., 1994). They found lack of evidence in policy development and recommend greater attention to policy formation and implementation. The application of policy analysis frameworks is considered in chapter three, alongside analysis of policy development and influence.

Culture as a facilitator or barrier to learning, including reading culture

Culture and the impact on technology adoption

The following studies applied Hofstede's model as a framework to analyse national culture, and how it influences the uptake of ICT and mobile phone technology.

Albirini (2006) examined culture as a factor for the successful implementation of ICT. This descriptive study paid specific attention to the teachers' cultural perceptions of ICT, using a mixed methods approach to collect data by distributing questionnaires to 326 participants followed by 15 telephone interviews. Although

the study was carried out in a high school, the results and theories help to explain some of the barriers to acceptance of ICT in developing countries. It is suggested that national, organisational, user and school cultures influence an individual's perceptions of new technology. Teachers themselves will be influenced by these perceptions and may impart positive or negative attitudes towards students' perceptions. Culture also influences initial acceptance and future usage of ICT, but the needs of society also stimulate change. In developing countries, ICT is not part of existing culture, and therefore there may be resistance to uptake and implementation:

> …importing a technology into developing countries without enough understanding of the home culture can result in an incompatibility between the technology and the culture and eventually raise resistance among the indigenous end-users to the technology. (Zhuang & Thomas, 1987, cited in Albirini, 2006, p.58)

Kaba and Osei-Bryson (2013) examined the influence of national culture on attitudes towards and use of ICT. They concluded that although technical and economic factors play a part, cultural and social factors may also be influential in ICT adoption. Lee, Trimi and Kim (2013) looked more specifically at mobile phone and technology adoption from a national cultural perspective. The US and South Korea were compared as they have contrasting cultures. They concluded that to penetrate a US or western culture with new technology, the product should be promoted individually by perceived usefulness, ease of use and quality. Alternatively, in developing countries, the culture is influenced through collectiveness of its population and strategies that address social determinants. The value of this study is that it also looks at ICT diffusion generally and how cultural models can be applied. The limitations are that to generalise, other data from individual countries should be included such as government policies, competition, and economic development. The theoretical models will be explored in chapter three.

Many studies show that culture does influence the adoption of technology. The Ejiaku (2014) study concluded that not enough attention is paid to cultural differences. Language is another barrier to acceptance and many developing

countries in Africa are translating computer software into local languages to make them more user friendly. Albirini (2006) also found that forcing the culture and new technology together can militate against acceptance of ICT in developing countries. Further to this, Abbott *et al*. (2008) cautioned against using western ICT systems and educational approaches to teaching knowledge and information in developing countries, unless it is culturally and contextually relevant. Poverty, illiteracy, poor infrastructure, lack of resources and the lack of local expertise were cited as major barriers to ICT adoption. In addition, the indiscriminate introduction of ICT projects by western nations has often been unsustainable, leaving a negative legacy. However, there are good examples of culturally appropriate ICT nursing initiatives, building on international cooperation to provide learning resources (AMREF, 2017).

Reading culture

Being able to read competently and fluently enables the transition from reading newspapers and books etc. to the application of reading skills in the online environment. However, African culture is divided into the 'home setting' and a 'school culture', and in the former an 'oral culture' exists rather than the 'reading culture' of the latter. People prefer to talk rather than read, and there has been much research to establish the reasons for this (Mlay *et al.,* 2015). In Uganda, outside the home, the school culture is based on the colonial system of reading and writing.

A study by Mlay, Sabi, Tsuma, and Langmia (2015) explored how ICT can improve reading habits among university students in Uganda. They also considered how home and school culture and income influenced reading habits. A qualitative phenomenological approach was taken to understand in detail the impact of ICT. Fifteen degree students from four universities, who use ICT, were selected for interview to find out how their reading habits have been influenced by using ICT. Most students, as children, had books in the home and were encouraged to read. They now engage in reading daily as students. Some students reported that when at home they were too busy doing household chores and had no time for reading. Most students also reported library facilities at school, but they were not always accessible, or they weren't allowed to use them. Okello-Obura (2011) considers

that the poor reading culture in schools in Uganda is due to lack of libraries or access to them. Previously, as children most students were exposed to computers in schools, had basic skills training and accessed the internet from internet cafes. One student had access in the home and this was reported to have a positive influence on reading habits. Those students who had access at school found it easier to search for information from the internet compared to those who didn't. Students also preferred to spend any disposable income on ICT devices to access reading materials than to buy books. All but one of the students accessed the internet daily via university WiFi in limited locations or internet cafes. Some used mobile phones or laptops. Most students used the internet for emails, social media, and searching for assignment or project materials. All students agreed that reading improves with ICT usage because the resources found are up to date, and they are more inclined to use ICT than read a book. There is a direct relationship between ICT and reading habits. The study also has implications for policy makers interested in making ICT more accessible in universities through directing finances into e-resources and developing infrastructure, and promoting the idea that schools work in partnership with parents to improve reading habits.

Bukachi *et al*. (2009), Mugisha (2009), Orem *et al*. (2012), Yagos *et al*. (2013) and Mlay *et al*. (2015) all discuss reading culture in their findings. Bukachi (2009) determines that some professionals in Africa prefer books to accessing information on the internet due to the lack of exposure to ICT experienced in more rural areas. The movement away from a traditional oral culture to a reading culture is still developing and resistance to it may impede change. Mugisha (2009) discusses how CPD and provision of textbooks promote a positive reading culture when ICT is developed as part of a CPD programme. Orem *et al*. (2012) identified from interviewees' comments that reading culture is poorly developed in Uganda, even among educated people, and that it is an essential for interpretation of research, effective discussion and policy making to take place. In relation to policy making, a reading culture is an enabling factor in understanding evidence-based information and research. Yagos *et al*. (2013) suggest from interviews that ICT will improve reading culture.

Theory of ICT adoption and engagement

Four research papers look specifically at the theory of ICT engagement in developing countries and how this influences development and uptake of ICT: Albrini *et al.* (2006), Isabalija *et al.* (2011), Lee *et al.* (2013), and Kaba *et al.* (2013). These theories are reviewed below but have been further explored in chapter three to consider their relevance to this thesis.

Global and developing countries

Albirini (2006) undertook a review of the literature followed by a descriptive study to explore the cultural perceptions of teachers towards implementation of ICT in developing countries; this study was reviewed in the previous section. As part of the study, Albirini discussed Roger's (1995, 1991, 2003) Diffusion of Technological Innovation theory to provide an explanation for why the introduction of ICT in developing countries poses challenges. The theory proposes that 'existing culture', 'social systems' and 'social norms' within a country or organisation may create barriers to change and prevent diffusion of innovation. The study gives examples of perceptions that militate against acceptance of the internet. They include the internet as a substitute for face-to-face contact, unwanted influences from other cultures, religious issues and being exposed to westernised technology. As well as the effect of national culture on technological diffusion, the micro-culture of organisations may also have an influence. Thus, barriers may exist between different places, for example between strategic and operational levels of government and institutions. There may be national acceptance, policy development and recommendations for ICT development, but resistance in some organisations while others will embrace change and innovation. The research suggests that models of technology transfer from developed to developing countries are influenced by the existing culture.

Isabalija *et al*. (2011) undertook research into factors affecting adoption, implementation and sustainability of telemedicine information systems in Uganda; this research was also critically discussed in the previous section. As part of the study, the following theories aiming to understand adoption, diffusion and transfer

of technology were considered: the 'technology acceptance' model (Davis *et al.,* 1989), and the 'diffusion of innovation' theory (Rogers & Shoemaker, 1973; Rogers, 1991, 1995). Davis's theory asserts that knowledge of technology leads to perceived ease of use and change of attitude, leading to more likely adoption and usage. The diffusion of technological innovation theory provides an explanation for why some technology users adopt technology early, while others are late adopters or non-adopters. They describe five stages in the adoption of technology process: knowledge, persuasion, decision, implementation and confirmation. Two conditions prevail in users' decision making: the first answers the question 'Do they know how to use it?' (knowledge); the second answers 'Are they aware of the advantages or benefits the technology offers?' (persuasion). From this, users are divided into early or late adopters; early adopters are influential in sustainability of the technology. Rogers also states that even with skills and knowledge of the benefits, some will not adopt. However, Isabalija *et al*. (2011) conclude that the research provides evidence that lack of knowledge prevents adoption and leads to rejection of technology; and conversely, knowledge plays a key part in the adoption of technology, in line with the theory.

Kaba *et al*. (2013) examined the influence of national culture on attitudes and use of ICT. They, too, considered the technology acceptance model (TAM) that can be applied to explain behaviour when using ICT. The model claims that "people adopt ICT because of its perceived usefulness and perceived ease of use" (Kaba *et al*., 2013, p.441). The TAM model has been used in sub-Saharan Africa. Although the study focuses on mobile phone use, the model can be applied more widely to ICT innovations such as adoption of the internet (Rice & Katz, 2013)

Kaba *et al*. (2013) also applied Hofstede's (1980) dimensions of national culture as a cultural framework in their study, to provide a more comprehensive analysis of ICT adoption and the influence of cultural context and environments. Hofstede's model describes five cultural dimensions which can be applied to determine the level of cultural influence: power distance; individualism versus collectivism; masculinity versus femininity; uncertainty avoidance; and short-term versus long-term orientation. The model will be further discussed in Chapter 3.

Lee *et al.* (2013) researched the impact of cultural differences on mobile phone adoption and considered Bass's and Hofstede's models, suggesting that national culture plays an important part in developing a national information infrastructure. The Bass model is used to analyse sales of ICT, mobile phones and the internet and their diffusion processes in a whole population. Connections are made between early adopters who influence potential adopters through social norms and word of mouth to increase uptake. The Hofstede model describes five dimensions of national culture, two of which, individualism and collectivism, are applied to analyse cultural differences between western and developing countries in mobile phone uptake. These models are analysed in Chapter 3.

Conclusion

The chapter critically reviewed and synthesised professional literature relating to the title of the thesis and aims of the research. Key search words were identified applying PEO criteria (Khan *et al.*, 2011) to the title of the thesis to generate research-based articles from credible sources. Specific criteria were applied until a workable number of articles remained for detailed scrutiny applying CASP criteria. Most research selected was qualitative. Ten key themes emerged that formed a framework in which to situate the literature.

The literature provided a comprehensive background comprising up-to-date research on CPD, computer technology and ICT development, barriers and facilitators to development, e-learning, knowledge, attitudes and perceptions, as well as policy, culture and underpinning theories pertaining to adoption of ICT and computer utilisation skills, all of which are influential in this thesis. Each literature theme was subdivided to include global, LMIC and Ugandan perspectives that informed the identification of gaps in research undertaken in Uganda. The specific gaps of interest to this thesis pertain to how nurses engage with computer technology in relation to their CPD and whether this is influenced by culture and policy formation.

Most of the health research undertaken in Uganda on CPD and use of computers relates to medical staff, healthcare workers (some of whom are nurses), and

university students in general, but the principles can be generalised to nursing. Only one research paper (Muliira *et al.*, 2012) explored if nurses undertook 'lifelong learning', citing lack of enabling factors such as CPD events and computer skills development. There is no dedicated research pertaining to nursing and the provision of CPD and computer skills training, nor to the extent to which CPD takes place or how effective it is; this therefore represents a gap in the research.

Several health related research papers in policy development and application to ICT development are situated in Uganda, but only one refers to nursing and the UNMC data base for nursing registrants. No research was found into policies which specifically address nursing in relation to CPD or computer skills development or utilisation. Therefore, this represents a gap in the research.

There are numerous research studies that explore culture as a facilitator or barrier to learning and ICT adoption situated in western and developing countries. However, studies in Uganda focused mainly on reading culture in schools and universities which is then linked to adoption of technology. Again, this can be generalised to nursing but there is a lack of research pertaining to reading culture linked to CPD and computer skills development in nursing practice.

Underpinning theories relating to the influence of culture and adoption of technology were researched in depth in some of the literature and provided an important perspective on the dimensions of national culture, diffusion of technology and technological acceptance at national and individual level. A further exploration on how they are applied and the importance to this thesis are discussed in chapter 3.

Research Questions

Three research questions were formulated from the literature review which informed interview and focus group questions and data analysis.

The research questions derived from the review of the literature are:

- Is the professional development of nurses and how they utilise computer technology influenced by policy and culture?

- What are the nurses' views and experiences of using computer technology?
- What are the facilitators and barriers to learning and using technology?

Chapter three continues to explore knowledge, concepts and theories generated from the research literature to explore their application to this thesis, through a review and synthesis of Ugandan policies, culture and underpinning theories.

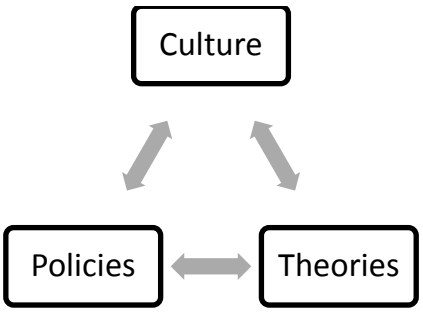
Chapter 3: A Critical Review of Ugandan Policies, Culture and Underpinning Theories

Introduction and aims of the chapter

The literature review inspired a further targeted search and analysis of Ugandan policies and cultural and technological theories relevant to the research. Selected policies introduced in recent years are analysed to illustrate Uganda's progress towards development of health services, ICT infrastructure and nursing education, including nurses' CPD and their utilisation of computer technology.

The review provides a critical understanding of how the country has developed at national and strategic levels, and the potential impact on the research setting. To understand Uganda as a country, significant factors that have influenced its development both politically and culturally are critically analysed, to provide an explanation of its status as an aspiring middle-income economy (World Bank, 2017); this is presented as a PESTLE analysis.

Figure 3.1: Integrated model to illustrate the content of the chapter and relationship between policies, culture and theories



PESTLE analysis

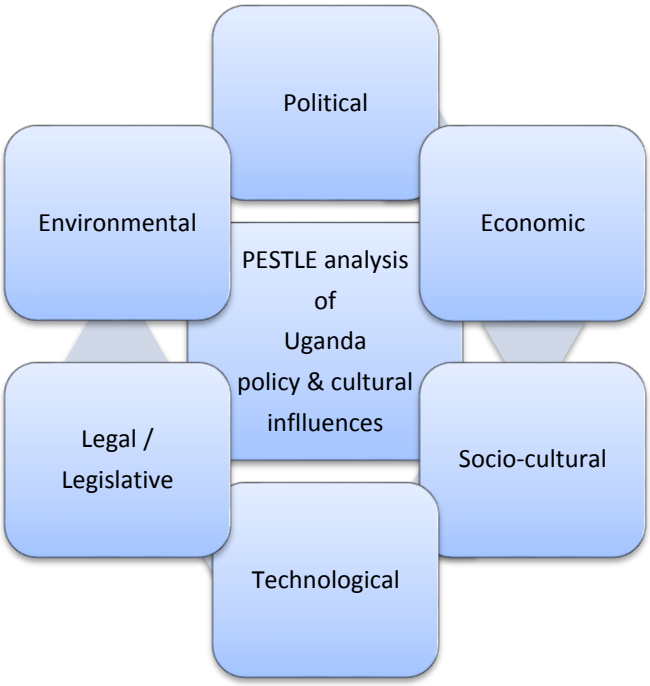
To undertake an analysis of Uganda's policies and culture, and to frame the chapter, a contemporary framework is applied, based on Aguilar's (1967) updated PEST(LE) model (Barr & Dowding, 2016). It is used to situate the policy analysis, theories of cultural influence and models of IT acceptance identified in the literature review.

Aguilar (1967) is credited for inventing the PEST tool, which originally provided a framework for analysing businesses. More recently, the tool and its variations have

been used to analyse countries' development at strategic or macro level. Examples of country analyses, including of the UK, were obtained to assess their suitability and applicability to undertaking such an analysis of Uganda (MarketLine, 2013). On scrutiny, the principles of the PESTLE analysis are universal in their application and country analysis is becoming a more widespread technique.

The PESTLE analysis framework is applied to assess and understand both external and internal influences that impact on the population of Uganda, including policy making (Barr & Dowding, 2016; Porter & Coles, 2011). Within this framework, a policy analysis model is applied (Buse *et al.,* 2005; Walt 1994, 1996, 1998) to analyse specific references to health, nursing, and ICT and its utilisation, to provide a more tangible analysis. Other models and theories are applied within the framework.

Figure 3.2: PEST(LE) analysis framework



(*Sources*: Aguila, 1967; Barr & Dowding, 2016)

Critique of Uganda – from a national to an individual perspective, and the identification of policies and theories that have influenced development

The following section provides a national critique of Uganda from political, economic, socio-cultural, technological, legislative and environmental perspectives following the headings of PESTLE analysis. The critique is followed by a summary of identified policies, theories and cultural models identified in the literature to gain a greater strategic understanding of the influences of policy and culture on the development of computer technology and utilisation at national, organisational and individual levels. The significance of this approach in an ethnographic study is that policy links with culture and can contribute to its analysis. Kellner (1997) argues that the analysis of culture should be situated within the political economy of a country, as politics and economics influence the central tenets of society and culture. He raises the issues of which activities within 'democratic' society should be governed by the state, and by how much or whether the market should be allowed to decide. This inevitably leads to concerns about power and control, and resistance to it. Kellner's work relates to the media and technology and suggests that computer technology may be controlled or censored in society through the political economy and influenced by the predominating national and local cultures.

The application to Uganda in the context of its more recent political history, as a developing economy and democracy, is speculative; yet the literature and data analysis suggest positive progress at national and local levels.

Figure 3.3: Map of Uganda showing surrounding countries

Political

Political system, historical context, population and demographic features, policies and drivers

Uganda is a country in Central Africa. It is landlocked and has borders with five countries: Kenya, Tanzania and Rwanda to the east and south provide relative stability, but the Democratic Republic of the Congo and South Sudan to the west and north present political unrest and instability. Uganda has been transformed in recent decades to a declared democratic country, following the political and military dictatorship of Idi Amin (1971-1979). He was preceded and succeeded by Milton Obote who was president twice (1966–1971 and 1980–1985). Uganda is currently led by Prime Minister Yoweri Museveni (1986–present day). In many African countries corruption is still recognised as a problem in the conduct of elections, and weak governance remains an issue in Uganda (Omaswa & Crisp, 2014) leading to mismanagement of public spending. Whitworth et al. (2010, p.31) reported that despite huge investment in public services including health, education and infrastructure, wages of public servants remained low. This led to 'the spread of corruption in Uganda alongside the rapid increase in public expenditure'. Cawley and Zake (2010) also link corruption to tax evasion and bribery which defied law enforcement during the 1990s and into the millennium. In recognition of the continuing problem, the Anti-Corruption Act was enacted in 2009 (NDP11, 2015).

The last few decades have seen major changes to the status of the surrounding countries: they have experienced wars, genocide and natural disasters, including drought and famine. Some have changed to more democratic regimes, yet military regimes are still present and are described as corrupt and autocratic. The Lord's Resistance Army (LRA) were still active in Uganda from the early 1990s until 2006, when international peace negotiations shifted the focus of their operations into the Democratic Republic of Congo (DRC) and the Central African Republic (CAR) (Smith, 2012).

Natural disasters including drought and flooding have affected over a million people in the last decade with torrential rains experienced in equatorial areas; climate

change is cited as a factor leading to unstable weather conditions (GHA, 2015, NDP11, 2015). The influx of refugees from neighbouring countries remains an issue, although it was at its height in 2006 through to 2010, largely of people fleeing conflict in South Sudan and the DRC as the LRA gained a hold in those countries (Smith, 2012, GHA, 2015). At the same time, many of the Ugandan population were displaced due to conflict in the northern areas because of LRA activities. Even in 2018, displaced people are still living in refugee camps, unable to finance a return to their original homes; this is compounded by the lack of any form of service provision e.g. in South Sudan, when they return (GHA, 2015). This is a *very* brief overview of the country setting and political context.

Population growth and poverty

The data produced by the human poverty index (HPI) indicates that Uganda is also seeing a substantial decrease in poverty, despite the doubling of population since the 1990s to the present day (GHA, 2015). However, in 2013 Uganda still had 35% of its population living in extreme poverty with an income of less than two dollars per day (Development Initiative, 2017). The Ugandan government aim to reduce this to less than 5% by 2040 (MHU, 2012). In 2015 the population of Uganda was over 32 million, with less than a quarter living below the absolute poverty line, demonstrating some decrease (NDP11, 2015).

In comparison to other countries in the world, Uganda still only ranks 90th out of 109 on the multi-poverty index (MPI, 2011) which measures deprivations experienced across health, education and living standards; but on more detailed analysis, some districts score much higher than others, with Northern Uganda and West Nile regions below average. The population is also growing at an annual rate of 3.2%, making it the third highest growth in the world with a population projected to exceed 93 million by 2040. However, the fertility rate is expected to decrease to give a more realistic 60 million population, as the country becomes more prosperous and infant mortality declines. With this growth rate Uganda also has a very young population, with 50% below 15 years of age giving the potential to contribute through employment to a growing economy (MOH, 2012).

Morbidity and mortality

Uganda plans to reduce mortality and morbidity rates through cost-effective health interventions, and is committed to meeting the MDGs and future SDGs targets. Life expectancy at birth in 2016 was 61.1 years for a female and 57.3 years for a male (World Bank, 2017), and the under 5 years mortality rate in 2016 was 55 out of 1000 live births. Maternal mortality has also fallen from 435 per 100,000 live births in 2006 to 325 in 2011, but this reduction is slow when compared to other countries. However, there are still huge variations in life expectancy and mortality between professional and other social groups, due to health and social inequalities, and to marked regional differences in services provision and development between the north and south of the country (Smith, 2012). For some provision e.g. for antenatal care, there is a planned shift to public health and community-based healthcare services rather than facility-based services, which would mean for example that women will avoid travelling long distances for antenatal care. It is also considered to be a cheaper and more sustainable alternative, as well as delivering increased life expectancy. This shift is also consistent with achieving MDGs and shifting to SDGs (WHO, 2015). Other specialised services will continue to run from specialised centres (MHU, 2012). A reduction in maternal and infant mortality is claimed by the hospital staff at the heart of the research location, which is testament to the development of local health services provision and the high levels of medical and nursing expertise.

Economy

Uganda has experienced one of the fastest growing economies in sub-Saharan Africa since 1986, following the Idi Amin regime. The changes to economic policy were aimed at addressing poverty by increasing the country's economic growth, shifting the focus to economic development, including reconstruction and infrastructure development. It took the decade of the 1990s to drive through initial economic reforms and enter a period of consolidation. Reforms took place from 2002 onwards, culminating in further economic growth both in the private sector and public services led by the government (Whitworth & Williamson, 2010).

Uganda accrued substantial debts during the 1980s and 1990s, and borrowed money heavily to resolve its debt crisis. At the time Uganda still relied heavily on aid from developed countries and the input from non-government organisations (NGOs). To resolve these issues, many aspects of the country were privatised including education and healthcare, but this created inequity (Freund, 1998). Amongst other organisations, in the early 1990s the World Bank (African Development Bank [ADB], 2009) organised a commercial buy back of commercial loans in Uganda attempting to resolve the situation, leading to the setting up of the MDF (Multilateral Debt Fund) and later the HICP (Heavily Indebted Poor Countries) initiative to help service the debts. Alongside this, any savings would be fed into the PAF (Poverty Action Fund), partly to reassure donors that any savings would be used for the people by providing interventions to reduce poverty. This would also contribute towards achieving the UN MDGs and later the SDGs. This remains the case, although greater measures are being put in place to administer and monitor the use of foreign aid in a 'hub' that oversees several African countries and parts of Asia.

In 2015 the development of the Ugandan Development Data Hub was launched, aiming to produce quality data on government finance spending, as well as demographic and population data and poverty statistics that are as accurate as possible. This was put in place to partly overcome any tendency to use development aid for purposes other than for which it was intended (Development Initiative, 2017). There is a history of corruption and misuse of aid and development funding. Because of democratisation and Uganda's economic growth in recent years, it has shifted from being one of the poorest countries in the world to having an increasing economy, seeing a growth of its GNI (Gross National Income) partly due to the discovery of oil in 2007 and greater control of fiscal measures. It aims to become a strong middle-income economy over the next few decades, as proposed in Uganda Vision 2040 (MHU, 2012). For the purposes of the thesis, Uganda is part of sub-Saharan Africa and classed as a low-income economy as defined by the World Bank (2017). The classification is determined by GNI per capita, in US dollars

converted from local currency. This is reviewed on an annual basis (World Bank, 2017).

Despite the rapid growth and development in Uganda, there is recent lack of progress in some areas according to Whitworth *et al*. (2010). Continued funding and sustainability of public infrastructure has been cited as problematic in health, education, water and road maintenance. Corruption is still an issue in public services (Kuteesa *et al.,* 2010). The NDP11 (2015) provides comprehensive data and a detailed policy plan for each governmental area, and includes an anti-corruption law.

Social and health services development

Uganda's vision (MHU, 2012) for development aims to improve adult literacy and access to universal education for all by the year 2015 is ambitious as the high dropout rate from education is a continuing problem (African Development Bank, 2009). Universal primary education is an aim of the Sustainable Development Goals (SDGs), linked to increasing the prosperity of a country and developing its infrastructure (WHO, 2015). Part of the educational reforms is to introduce computers so that all children and young adults in higher education have an opportunity to become computer literate (NDP11, 2015). In turn, this would feed through into the general population and all aspects of the economy. This is becoming evident in the research location as many young nursing recruits are already computer literate at entry to the profession.

Uganda's health sector strategic and investment plan (MOH, 2012) includes greater investment in primary healthcare, expanding rural health facilities, boosting the availability of essential drugs and increasing the number of qualified healthcare workers. Other social developments aim to increase access to electricity from 11% to 80%, and access to safe piped water from 15% to 80% of the population (MOH, 2012). Between 2010 and 2015, 36% of healthcare facilities lacked a power source or improved water source which impacts on the quality of healthcare services offered and risks of infection (WHO, 2015). There is evidence that these aspects of healthcare and services development are taking place, as indicated through an

increase in life expectancy, reduction in infant mortality, the achievement of specified targets under the Poverty Eradication Action Plan (PEAP) and an increase in numbers of healthcare workers (ADB, 2009). PEAP is a strategy to eradicate poverty in Uganda. However, it was implemented insufficiently quickly, with substantial variations between the health of the rich and the poor and the quality of healthcare facilities available to the population (MOH, 2012). It was replaced by the first National Development Plan in 2010 (Whitworth & Williamson, 2010); a second, revised development plan was introduced in June 2015 (NDP11, 2015).

The second plan (NDP11, 2015) links to the very rural landscape of Uganda, and the development of road and transport infrastructure to ease access to hospitals and healthcare facilities, along with travel to main centres of population and facilities including the capital Kampala (MFPED, 2004; MOH, 2012). Again, this is exemplified in the local area of the research, which owes its development to the clean water supply and recent hydroelectric scheme; this provides an example of how the country aims to develop its health services nationally. There are also plans to improve the road to the local area in the next few years as part of road infrastructure development.

Culture

As part of its vision for the future, Vision 2040 (MHU, 2012, p.9) states that "Ugandans aspire to a progressive and developmental culture that blends traditional beliefs and national values." However, currently Uganda professes to a lack of a national culture (MHU, 2012, p.95) based on the opinion that there is no recognised system of shared beliefs, values, customs, behaviour and artefacts that characterise Ugandan people. This is considered as one of the constraints experienced in the 1990s to socio-economic development, to be addressed through further policy development as part of Vision 2040 over the next 30 years that will help define national culture. Omaswa and Crisp (2014) describe how the traditional way of life in east Uganda has changed since the civil war, from being more cohesive and controlled by the elders to becoming a more dissident society. The diet has shifted from locally grown foodstuffs with the inclusion of chicken or fish

only on special occasions, to a western diet of fried food, fatty meat and high sugar content drinks. At the same time, life has become more sedentary impacting on health and lifestyle. Omaswa and Crisp (2014) propose that health goals are embedded in policy to address social determinants of health across the population, and at the same time legislators should work closely with the international community to achieve improved health outcomes. This is an example of the cultural shift that has changed the way of life in Uganda. Culture, its characteristics, models and influence are explored later in the chapter.

Technology

Uganda 2040 (MHU, 2012) and the Ministry of Information and Communication Technology (MICT, 2012) aspire to develop ICT skills and training throughout the country's industry and education system to achieve a highly skilled workforce and future population. Omaswa and Crisp (2014) discuss the transformative power of technology in general terms throughout Africa. They specifically cite the training of nurses and community health workers through distance learning and technology as being important.

The country will continue to develop its ICT infrastructure, link up with international systems, and connect to fibre optic cable networks and satellite technology in the longer term (NDP11, 2015; MHU, 2015). The National Development Policy (NDP11, 2015) documents a high rate of computer illiteracy and low level of computer penetration in the country: the ratio of penetration in rural to urban areas is estimated to be 20:80%. Expanding IT internally to enable Uganda to be part of the international arena in both the public and private sectors is rated as being of high importance. At the time of the report, the country relied on satellite connections, which are generally slow and expensive. There has been progress in the private sector with putting fibre optic cables in place, but this is mainly in urban areas. The aim is to expand the network throughout the country. The availability of internet connections at the research location is fairly well developed in comparison to other areas, but the experience of informants continues to reflect the national experience of unreliability and cost (Gidman & Wilson, 2013). The MICT report (2012)

encourages public and private partnerships regarding ICT development, as exemplified in the ICT developments at the research location. The report (MICT, 2012) also states that as yet there is no policy on managing IT repair and the disposal of e-waste. This was a significant point raised in informant interviews. The policy (MICT, 2012) was written in relation to the MDGs whose implementation is partly dependent on an effective ICT infrastructure. In addition, the UN Declaration of Human Rights (UNDHR) (UN, 1948) determines that communication is a human right, as is further emphasised in the Ugandan constitution and the first National Development Plan (2010-2015).

However, in Article 19 (UN, 1948), "Everyone has the right… to seek, receive and impart information and ideas through any media and regardless of frontiers." Communication and ICT are enshrined in this context (UN, 1948). To this end the National Information Technology Authority – Uganda (NITA-U) is responsible for implementing IT policy, regulating standards, monitoring the utilisation of IT in the public and private sectors, and providing technical support for IT systems. In addition, the Ministry for Education in conjunction with individual organisations will develop IT curricula across the education system, promote IT research and provide IT training. The health sector is expected to develop along similar lines. The aim is to review the policies every five and ten years in respect of IT needs and usage in all sectors. The underpinning theory behind the policy relating to ICT diffusion and adoption is examined later in the chapter.

Legal

Legislation, policy search and analysis

The Ugandan government aspires to improve the socio-economic conditions of its people through the first and second National Hospital Policy (MHU, 2004, 2010), which aims to eradicate poverty by promoting a healthy and productive population. The local hospital policy, applicable at the research site, is to provide services appropriate to a district hospital and community outreach services. The Ugandan National Development Policy (MHU, 2015) and Vision 2040 (MHU, 2012) set out the

development strategy for computer technology, health and nursing education for the future of Uganda.

Some specific research identified in the literature review also provides a backdrop of evidence to this section:

- Research undertaken to develop a one-stop shop for policy documents in Uganda has proved useful in identifying specific policies (Mutatina *et al.*, 2017);
- Using evidence in policy making in Uganda to address the problem of knowledge translation (Orem *et al*., 2012);
- Using information systems to address nursing registration and workforce planning for the UNMC which feeds into strategic planning for the Ugandan healthcare system (Spero *et al*., 2011);
- Carrying out a literature review of health policy analysis in LMIC (Gilson & Walt, 2008) and undertaking health policy analysis (Walt *et al*., 2008);
- Reviewing other documents which have provided pointers to the provenance of policy making, originating from the WHO, the UN and the WB;
- Colebatch (2009), Bardach (2009), Buse *et al*. (2005) and Walt (1996) also provide extensive subject coverage on the concept of policy, its formation, analysis and evaluation. These texts have all served to provide a means to analyse and evaluate policies that have influenced this research.

Policy search

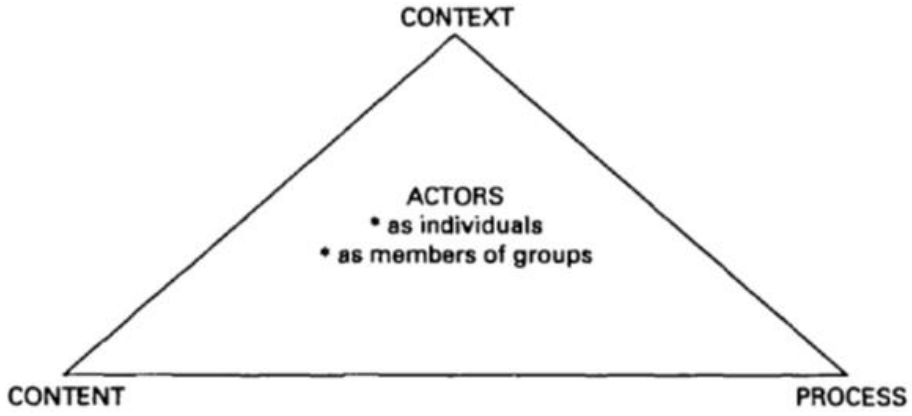
The initial search involved selecting legislation and policies through exploration of the Ugandan National Web Portal, the Ugandan Ministry of Health website, the Uganda Nursing and Midwifery Council website, and linked searches using key terms to identify other relevant policies. Each policy was scrutinised by applying specific criteria that would provide a guide to their relevant content and selection for referencing.

Context, content and process of policy development and analysis of driver policies, Uganda

Walt (1994) emphasises the complexity of health policy analysis, even though the model in her diagram is presented simply. Each of the four sections are interrelated with the 'actors' being central to the policy making process. According to Walt *et al*. (2008), the health policy environment is changing, meaning that policy making is much more likely to involve a greater range of actors or stakeholders including government officials, the public and private sectors, NGOs, and ideally the public and service users. In addition, the process of policy making is affected by the actors themselves, their values, knowledge and position in the organisation. There was evidence of stakeholder involvement in the policies examined (Table 3.1). Spero *et al*. (2011) provided an example of involving stakeholders in policy making when developing the Human Resource Information System (HRIS) system for the UNMC in Uganda.

Selected documents were appraised and summarised using Walt's policy analysis triangle (Figure 3.4, and Table 3.1).

Figure 3.4: A model for health policy analysis



(*Sources*: Buse *et al.,* 2005; Walt & Gilson, 1994)

The content and formulation of policy in the past has often not included wider influencing factors (Walt *et al.,* 2008) such as policy implementation assessment and evaluation (Weimer & Vining, 2011). According to Walt *et al*. (2008), policy implementation often fails because factors affecting implementation are not considered; the types of question that could usefully be asked include 'Is the

proposed change desirable? Or will it cause social stability or instability?' The implementation of policy also depends on funding arrangements, as well as the ability of organisations such as health services, to interpret, implement and evaluate the impact of the policy in terms of outcomes and effectiveness.

The context of the governmental/legislative working environment should also be considered, such as the macro government and micro organisation levels, the political regime, political ideology, and history and culture. This change in environment has made policy analysis a more complex process and led to various challenges such as the influence of increasing globalisation, technology and communications; these impact on governments internally and externally, resulting in greater involvement of the people and knowledge acquisition.

Policy making in developing countries

Walt and Gilson (1994) suggest that policy analysis is a well-established activity in the developed world, but its application is limited in developing countries. Walt (1996) argues that the health sector has been neglected, despite the crisis in health systems and proposed reforms. Countries should be cognisant of how reforms are conducted and the facilitating and opposing factors that influence the process. Walt (1996) discusses how donors dominated the political arena in post-conflict Uganda in the 1980s, and that effective health policy should have been developed earlier to guide priorities and meet needs in the population. The continuing political development of Uganda in the last ten years is punctuated with many policies which show adherence to good practice in policy making to guide services development, according to Walt's policy analysis triangle. However, there is little evidence to demonstrate how policies are disseminated and implemented at local level. There are exceptions, for example the increase in computer laboratories in schools and the development of the national ICT infrastructure (NDP11, 2015). A comprehensive approach to policy making can lead to effective change by improving implementation and final outcomes. The triangle model can be applied either prospectively for planning or retrospectively for policy analysis (Buse, Mays, & Walt, 2005; Walt *et al.,* 1994).

Policy analysis table aligned with PESTLE analysis

The following table contains legislation and policy search results from the Ugandan National Web Portal aligned with the PESTLE analysis of Uganda.

Table 3.1: Summarised policy analysis table

	Website/References	Policy/Guidance
Political	Ugandan National Web Portal http://gou.go.ug/government Ministry of Health Uganda Knowledge Management Portal http://library.health.go.ug/publications/leadership-and-governance-governance/policy-documents/second-national-health-policy Uganda Vision 2040 (MHU, 2012) http://www.gou.go.ug/content/uganda-vision-2040 Second National Development Plan (NDP11) 2015/16–2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf	Gateway to government publications – general and health. Framework to NDP11 (2015). The NPD11 takes forward the Uganda Vision from 2015 to 2020. The NDP11 (2015) is relevant to every section.
Economic	Uganda Vision 2040 (MHU, 2012) http://www.gou.go.ug/content/uganda-vision-2040 Second National Development Plan (NDP11) 2015/16–2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf The NPD11 takes forward the Uganda Vision from 2015-2020	The Vision 2040 is conceptualised around strengthening the fundamentals of the economy to harness the abundant opportunities around the country. The plan prioritises investment in five areas with the greatest multiplier effect on the economy.

	Website/References	Policy/Guidance
Socio-cultural	Second National Development Plan (NDP11) 2015/16 – 2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf The Second National Health Policy (MHU, 2010) http://library.health.go.ug/publications/leadership-and-governance-governance/policy-documents/second-national-health-policy	Selected extracts around social development, health education, adult literacy and culture. Health policy and infrastructure in relation to ICT. Training and recruitment. Culture and creative industries.
Technological	Second National Development Plan (NDP11) 2015/16– 2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf Ministry of Communication and Computer Technology (MCCT, 2012) Information technology policy for Uganda http://www.ict.go.ug/	**ICT development** The ICT sector – effective and efficient development through harnessing and utilising ICT in all spheres of life. It is composed of telecommunications, postal, information technology, and broadcasting subsectors. HMIS and skills development. Aim of the policy: To promote the development of ICT infrastructure and services throughout the country.
Legal/legislative	Second National Development Plan (NDP11) 2015/16– 2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf The first Ugandan National Nursing and Midwifery Council Policy (draft) (MHU, 2016)	**Legislature and accountability (p.47)** The Government of Uganda has adopted the 'Zero Tolerance to Corruption Policy' (2009).

	Website/References	Policy/Guidance
	http://library.health.go.ug/publications/leadership-and-governance-governance/policy-documents/first-uganda-national-nursing-and	Nurses and midwives form the backbone of health service delivery, constituting more than 60% of the healthcare work force in Uganda (MHU, 2007). Policy development.
Environmental	Second National Development Plan (NDP11) 2015/16–2019/20 (MHU, 2015) http://npa.ug/wp-content/uploads/NDPII-Final.pdf	Environment and natural resources Climate change

Evidence of the policy making process

Texts written by Buse *et al*., (2005) and Walt (1996), and research by Walt *et al*. (1998), Gilson *et al*. (1998) and Walt *et al*. (1994), apply the policy analysis triangle in western and developing country contexts. The criteria enable analysis of selected policies to establish whether there is evidence of systematic policy making and implementation planning. The content of each policy examined demonstrates clear aims and contains considerable detail providing a rationale for its development, with research and data to provide a baseline for evaluation. The policies all refer to stakeholder involvement; although do not all develop the details of their involvement and responsibilities, they do contain lists of those involved in the policy process. The UNMC (2016) is very clear about who the stakeholders were and the extent of their involvement, from nurse practitioners to government officials. The IT policy (MCCT, 2012) is also clear about consultation with stakeholders. There is specific evidence of a systematic process of policy planning and development in the UNMC (MHU, 2016) policy. This is not as clear in the other policies. In the context of policy, there is evidence of enablers and constraints to policy making, including maximising funding arrangements in the Uganda Vision (MHU, 2012). Conversely, in the IT policy (MCCT, 2012) further investment and infrastructure development are required to implement the changes. The level of illiteracy and IT illiteracy is identified as a constraint to policy implementation.

Uganda Vision 2040 (MHU, 2012) contains general statements to guide more detailed policies and implementation plans throughout government organisations. A key quote states that:

> …ICT shall be mainstreamed in education to take advantage of ICT-enabled learning and to prepare future generations of ICT-savvy workers, and ensure their effective utilisation… (Uganda Vision, MHU, 2012, p.57)

The overall vision (MHU, 2012) is ambitious and touches all areas of the economy. It is led by the President and is the responsibility of every citizen and organisation in Uganda to implement alongside the National Development Planning framework (NDP11, 2015). Financing will be mainly through the government, development partners and the private sector, and the framework describes conventional and

non-conventional means of funding to achieve its aims. It refers to partnership arrangements with local and national institutions. In relation to technology, the government will partner with the ICT industry and academia to stimulate growth and employment. National culture is also addressed in the vision (MHU, 2012). Uganda professes to "lack a shared Ugandan culture", and this is cited as one of the constraints to socio-economic development (MHU, 2012, p.94). It is an ambition of Uganda to nurture a progressive culture that combines traditional beliefs and values, and to develop policies and programmes that define national culture, ethical conduct and behaviour of its citizens. It is particularly aimed at young people to shift thinking and practices. How far cultural change impacts on the transformation of society and technology diffusion is observed in the data analysis (chapter five).

The second National Development Plan 2015/16 – 2019/20 (NDP11, 2015) contains many sections that relate to areas of ICT and health. It refers to infrastructure development with well-developed ICT communication networks, high speed internet, and increase in the layout of fibre optic cables and 4G through extension of the National Backbone Infrastructure (NBI). It also states that areas of public sector management are generally constrained by weak planning, policy making, service delivery and low adoption of ICT. There is huge scope here to meet the aims of Uganda Vision 2040 (MHU, 2012) by greater public involvement and policy development. Health and social developments refer to disease management, national health insurance schemes, universal access to family planning services and development of the health infrastructure. The high levels of illiteracy are thought to be influenced by the lack of public libraries to facilitate literacy and the high student dropout rate in primary schools. Seven million people, 28% of the population, are estimated to be illiterate with higher numbers in rural areas. The illiteracy rate impacts in all areas of the economy and technology adoption, and the National Adult Literacy Policy (2014) is set to address this.

Evaluation of the first NDP in 2010 (NDP, 2015) includes achievements supported by national data: reduction in poverty, reduced under 5 years mortality, increased life expectancy, developments in road and power infrastructure, growth in the ICT

sector and sustained peace and security. Although a Health Management Information System (HMIS) has been introduced, the reliability of data is impaired by connectivity issues and power shortages. In a related vein, the Second National Health Policy (MHU, 2010) cites shortage of medical equipment, staff accommodation and ICT as challenges; this has been superseded by the NDP11 (2015) health section.

The Ministry of Communication and Computer Technology (MCCT, 2012) produced the technology policy for Uganda with its broad aim to develop the ICT infrastructure and services. The policy refers to sociological, economic and technological factors to bring about change and transformation of the rural economy, arguing that regional and global competitiveness depend on comprehensive adoption of ICT. This policy refers directly to working with stakeholders in public and private sectors to develop IT systems and services. Despite the government knowing that increasing IT literacy is essential to take forward developments, it remains a problem to be addressed which requires funding and equipment to provide essential services for the population.

The First Ugandan National Nursing and Midwifery Council Policy (MHU, 2016) was a revelation to the researcher, showing quite a different approach in its policy making and development processes to other policies discussed here. Extensive consultations took place in meetings and workshops with the MH and a wide range of stakeholder institutions, partners, and nursing and midwifery practitioners. A review and analysis were undertaken of international professional trends, best practice recommendations and guidelines that all contributed to writing this policy. In addition, a literature review was completed, and the draft was further presented to stakeholders before ratification. The policy development also considered global and regional developments, including achievement of MDGs, current SDGs and the national policy context.

There is evidence of structured policy making in Uganda to guide all sectors of the economy**.** Some policies examined show greater adherence to systematic policy making, and some evidence of implementation processes and evaluation. The

NDP11 (2015) provides an evaluation of the first NDP (2010). Uganda Vision 2040 (MHU, 2012) also provides evidence of progress towards achieving the MDGs. Other policies were the first of their kind to be produced such as the first UNMC policy (MHU, 2016).

Conclusion

The analysis of selected policies relevant to the overall development strategy for Uganda, including ICT and infrastructure expansion, improvement of health services and the professional development of nursing, have been explored to gauge their strategic impact and individual influence on nurses' CPD and development of computer utilisation skills. The following sections assess the theoretical environmental and cultural impacts on society and individuals in relation to the diffusion, acceptance and adoption of ICT nationally and in the research location.

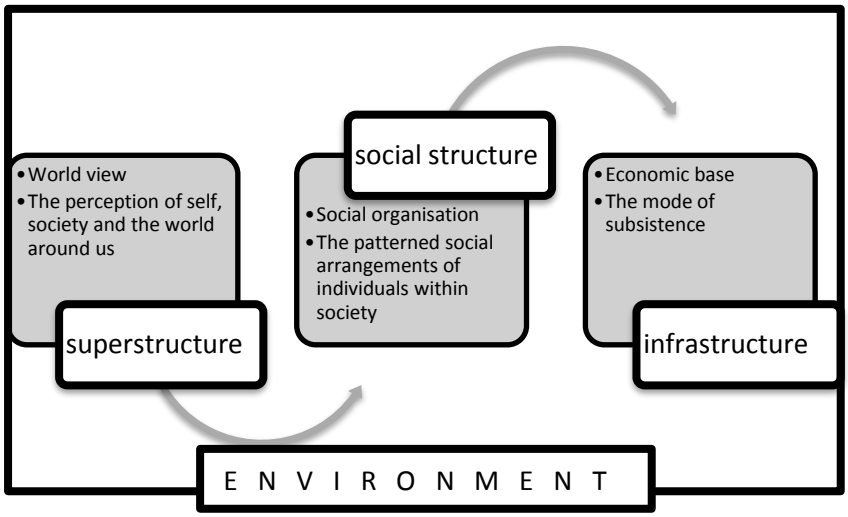
Environment

Environmental and cultural theories

Definition of culture and discussion of its relevance

The thesis proposes to identify how culture influences the CPD of nurses and their utilisation of computer technology. The literature review included research undertaken into the influence of culture on the adoption and uptake of ICT. This has led to further review of the literature to define culture, to explore its attributes and identify applicable cultural theories or models in which to conceptualise influencing factors on the adoption and uptake of ICT. The definitions provided by Haviland (2013) and McCurdy (2005) are explored. Haviland *et al.* (2013) describe culture from the perspective of anthropology as an integrated and dynamic system that consists of three broad categories (Figure 3.5).

Figure 3.5: The barrel model of culture



(*Source*: Redrawn from Haviland *et al*., 2013)

The model focuses on analysing the culture of a society by considering:

- Its superstructure – the world or strategic view and national ideology;
- The social structure – including patterns of social organisation of individuals within society;
- The infrastructure – includes the economic foundation and means of subsistence.

These are interconnected within the environment, including its natural resources and how an individual is situated and interacts within a society's cultural influences (Haviland *et al.*, 2013). Cultural adaptation and change occur due to changing circumstances such as physical changes to the environment over time, and technological innovation resulting in modification of behaviour and values within the culture.

McCurdy *et al*. (2005) define culture as:

> …knowledge that is learned and shared and that people use to generate behaviour and interpret experience… (McCurdy *et al*., 2005. p.5).

In ethnographic research, culture is described by McCurdy *et al*. (2005) as being either tacit, where culture is inferred through observation; or explicit, where cultural knowledge is identified through interviewing or listening to a person.

Informants' perceptions and descriptions of culture are considered during interviewing, participant observation and the process of data analysis to distinguish between different expressions of culture by the informants and observed by the researcher. The following table consists of McCurdy's list of attributes of culture which serve to distinguish cultural knowledge from personal knowledge.

Table 3.2: Attributes of culture (McCurdy, Spradley, & Shandy, 2005) with researcher examples

Attributes of culture	Examples
Culture is learned	Culture is not biologically inherited. Children learn from parents, families and groups. Adults in new situations, e.g. work location, learn a new 'inside culture' of the workplace involving people, places, activities, new terminology and the culture of technology.
Culture is shared	This is social knowledge rather than individual knowledge. For example, an outsider in a new social situation or visiting a different country may not share the same cultural knowledge e.g. language, customs, other differences. It also helps to understand why differences exist. These are typical of visitors to the research location.
Culture generates behaviour	Behaviour is considered as an outcome of culture. For example, it may apply to dress code in different countries or communities, or professional groups e.g. nursing uniform. In changing cultures, this may be applied to new behaviours such as acquiring new skills e.g. resulting from technological change.
Culture interprets experience	Behaviour may be adapted according to identified social situations. Could be equally applied to the workplace and adapting to technological change.

Discussion

Ethnography as a research methodology is a means by which cultural knowledge can be learned through contact with different groups of people, and contributes to understanding and interpreting behaviour. In the research location, the culture of the hospital and workplace reflects an integration or interface between social, professional, Ugandan and western cultures. Most of the permanent workforce in medical, nursing and administrative positions are Ugandan, with a small number of UK missionaries in senior management and voluntary positions. In addition, there is

a small throughput of medical, nursing and technical staff and other skilled volunteers from the UK, USA and Europe who are on site for varying periods from one or two weeks to several months, to share and contribute to professional knowledge and skills development of the Ugandan workforce. A further discussion on culture and potential cultural clashes follows data analysis in Chapter 5.

Figure 3.6: Illustration to represent the interface and integration of social, professional, Ugandan and western cultures at the research location

Models and theories that underpin ICT adoption

Cultural and behavioural models discussed in the literature review are analysed in this section to provide an understanding of the cultural and behavioural influences that impact on ICT adoption at government, organisation, community and individual levels (Table 3.3). Three of the models are explored in depth.

Table 3.3: Summary of theories and models influencing the adoption of ICT – nationally, organisationally and individually

Theories	Summary	Reference citations
The Hofstede model of cultural dimensions	Considers five dimensions of national culture that can distinguish different types: • Individualism v. collectivism • Power distance • Uncertainty avoidance • Masculinity v. femininity • Short v. long-term orientation (later addition) Culture is seen as a constraint limiting scope of actions by individuals and organisations. Culture is a frame of reference.	Hofstede (1980) applied in Kaba (2013) and Lee *et al.* (2013) Hofstede, Hofstede and Minkov (2010)
Technology acceptance model (TAM 1, 2, 3) **Further manifestations of the model – see Lai (2017)**	Used to explain computer usage behaviour and acceptance. Two beliefs: perceived usefulness (PU) and perceived ease of use (PEU) that influence behaviour. TAM model is most used framework for predicting technology intentions and adoption (Lai, 2017). Tested as valid and reliable explaining its acceptance.	Davies *et al.* (1989), applied in Isabalija *et al*., (2011) and Kaba (2013). Refined by Venkatesh and Davies (1996, 2000), applied in Lai (2017)
Theory of reasoned action (TRA)	Theory to predict behaviour intention. Behaviour can be influenced by two main factors: personal attitudes, and perceived attitudes of others including 'social norms'. Intentions are determined by feelings towards the behaviour – cultural values influence behaviour or actions by individuals.	Trandis (1980), applied in Kaba (2013) and Lai (2017) Anisman (2016)
Theory of planned behaviour (TPB)	TPB includes a third factor that further impacts on an individual's behavioural intention. Links beliefs with behaviour. An individual may be influenced by a perceived (or actual) element of control which may limit or moderate their behaviour.	Lai (2017) Anisman (2016)

Theories	Summary	Reference citations
Diffusion of technology innovation theory	Considers early and late adopters of technology. Five stages of adoption process: knowledge, persuasion, decision, implementation and confirmation. Two conditions exist for user's decisions: a) they know how to use it, b) if they know the advantage and/or the benefits of the new technology. Even in this knowledge some will not adopt (continued rejection). Users described as innovators, early adopters, early majority, later majority and laggards.	Rogers and Shoemaker (1973), applied in Isabalija *et al.* (2011) and Lai (2017) Rogers (2003)

ICT models and application to the research location

Theories and models identified in the literature review provide evidence of the impact and influence of behaviour and culture on the adoption of ICT. However, there is limited specific research on the impact that culture has on diffusion of innovation or the adoption of technological innovation in developing countries (Kaba, 2013). It is suggested by Kaba (2013) that ICT adoption would be better understood if the national culture and the cultural context of the individual were considered as part of the planning and implementation process of ICT. Policy making at strategic and organisational levels also theoretically provides the framework for ICT implementation and technological change to take place. Davies' (1989) technology acceptance model (TAM), and Rogers' (2003) diffusion of innovation theory include culture as well as social factors of influence, and provide a contextual understanding of the factors influencing the development of computer utilisation skills in the research location. Hofstede's cultural dimensions broadly define national culture, assisting in the understanding of Uganda in the context of sub-Saharan Africa. Hofstede's, Davies' and Rogers' models are summarised in more detail below, and their relevance and application to Uganda and the research location are considered.

Hofstede's model of cultural dimensions

Hofstede's model of dimensions of national culture (Hofstede *et al.*, 2010) is applied to research studies which aim to determine the impact of culture on the adoption of ICT by taking cultural differences into account (Kaba, 2013; Lee, 2013). These studies drew conclusions about countries in sub-Saharan Africa which may provide an explanation of national ICT infrastructure in Uganda and the processes of implementation and adoption in the research location. Hofstede, Hofstede and Minkov (2010) undertook extensive research, in many countries including Uganda, over several decades worldwide resulting in the theory of dimensions of culture, and have amassed huge databases. They constructed broad country groupings – America, Europe, Africa and Asia – and compared individual countries to assess the impact of cultural difference on how societies develop and change. The research location in Uganda reflects an interface between western and sub-Saharan African cultures, in a hospital environment, as previously discussed. The ICT system at the research location is well developed which may be a result of the influences of western culture in the faith-based hospital which is supported by western-based charities. However, the national infrastructure is also influenced by cultural characteristics of developing countries, as described by Hofstede *et al.* (2010). Uganda also demonstrates economic growth that indicates how country classifications can change over time. It is useful, therefore, to visualise each dimension as a continuum (see figure 3.7).

Hofstede's five dimensions are described as follows:

- **Power distance** reflects the gap between a government and its people. A larger gap reflects a greater level of inequality. According to Hofstede *et al.* (2010), Kaba *et al.* (2013) and Lee *et al.* (2013), this is characteristic of developing countries in Africa.
- **Individualism versus collectivism** are presented by Kaba et al. (2013) as representing opposing cultural trends. In individualist cultures, typical of western countries, the emphasis is on individual freedom. In collectivist cultures there is a trend towards conforming to the rules of the community or society, which characterises many African countries. Both impact on

individual behaviour. The latter would typify the research location and may influence the pace of change.

- **Masculinity versus femininity** characterise values in society. Masculine values include materialism, competitiveness and advancement whereas feminine values include security, friendly work environment and quality of life (Kaba, 2013; Lee, 2013). Sub-Saharan African countries are considered to be in the feminine category with less emphasis on material goods and more on good relationships.
- **Uncertainty avoidance** is said to be a crucial factor in the acceptance of technological innovation (Kaba, 2013). Where there is high tolerance of uncertainty in society, acceptance of technological innovation is greater, whereas societies that display lower tolerance of uncertainty favour the status quo and are slower to change, as in some African countries (Kaba, 2013).
- **Short versus long-term orientation** is associated with recent economic growth (Hofstede, 2010) and connected to society's degree of belief in traditional values. Long-term orientation refers to future values and equates to western nations, which are more likely to embrace ICT than other societies. Short-term orientation concerns being tied to traditions and values of the past and present rather than looking to the future. These countries tend to be poorer with slow economic growth and consequent delay in adoption and development of ICT (Hofstede *et al.,* 2010). Again, this would characterise developing countries.

Figure 3.7: Representational figure of Hofstede's Five Dimensions of Culture as a continuum

Reflects western cultures	**Reflects sub-Saharan African cultures**
Shorter power distance ⟷	Wider power distance
Individualism ⟷	Collectivism
Masculinity ⟷	Femininity
High uncertainty avoidance ⟷	Low uncertainty avoidance
Long term orientation ⟷	Short term orientation

Although foremost a national model, elements of the theory can be applied at individual level such as individualism versus collectivism. Hofstede *et al.* (2010) also refer to many layers of culture that influence individuals including national, regional, ethnic, religious, gender, generational, social class, occupational and workplace influences, some of which may conflict. This complexity makes it "difficult to anticipate behaviour in a new situation" (Hofstede *et al.*, 2010, p.18).

Application to Uganda and research location

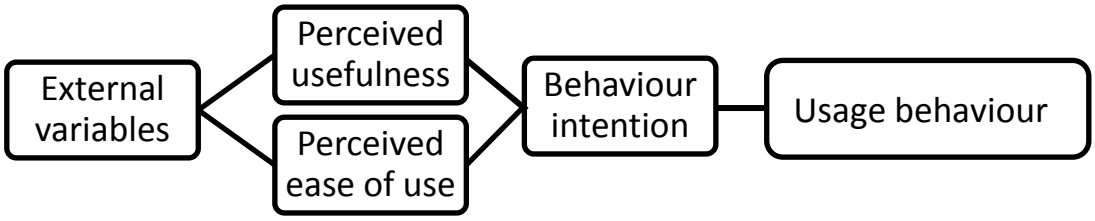
In terms of national cultural dimensions (Hofstede, 2010), sub-Saharan Africa including Uganda is characterised by: reflecting a distant power base; being collective (rather than individualistic); being a feminine (rather than masculine) society; having a low tolerance of uncertainty avoidance (rather than high tolerance); and having a shorter-term orientation (rather than long-term). The world survey by Hofstede *et al*. (2010, p.257) in 2007 ranks Uganda as 76th out of 93 countries in the world for long-term orientation, confirming its short-term position. The PESTLE analysis of Uganda demonstrates that after a slow start to economic growth in the 1980s and 1990s, the economy is now growing faster with increasing adoption of ICT in the last decade. However, in Uganda and the research location, the national cultural position is not clear as democratisation, development and adoption of western values and progress towards adoption of technology at national and local levels would potentially influence this position on the continuum of each dimension. The research location is unique as it reflects both western and sub-Saharan African characteristics.

Technological acceptance model (TAM)

Davies *et al.* (1989) developed the TAM theory to explain computer usage behaviour at individual level (Lai, 2017). It has since undergone three major revisions including attitudes towards use, although this is contested (Lai, 2017). The basis of the theory is to determine why technology is accepted or not, and depends on its perceived usefulness (PU) and its perceived ease of use (PEU) (Isabalija *et al.* 2011; Kaba *et al.*, 2013; Lai *et al.*, 2017). Kaba's research suggests that an

individual's perceptions of ease of use and usefulness are influenced by culture and social structures, and if the technology is beneficial to the user. Initially, the model was used to explain the likelihood of ICT adoption in mainly western society; but the extent to which culture and social pressure play a part in developing countries, including sub-Saharan Africa, is recognised as a subject for further research (Kaba *et al.*, 2013). Ahlan *et al.* (2014) undertook research in Pakistan for implementing health information technology (HIT) in developing countries. The proposed model is an extension of the TAM as well as the PU and PEU concepts. The likelihood of using technology was found to be influenced by the attitude of the user and their intention to use it. Other studies did not find 'attitude' as significant (Lai, 2017). The TAM model can be applied to the adoption of various forms of technology including use of telemedicine (Ahlan *et al.*, 2014; Kaba *et al.* (2013).

Figure 3.8: Final Technology Acceptance Model (Venkatesh & Davies, cited in Lai, 2017)



The latest version of the model (TAM3) includes external variables that influence PU and PEU: these are individual differences, systems type, social influence and facilitating conditions. Computer usage may be moderated by individual experience, such as anxiety about using computers that can impact on behaviour intention (Lai, 2017).

Theory of reasoned action (TRA) and the theory of planned behaviour (TPB)

Lai (2017) reviewed several revisions of the technology acceptance model and compared TAM, TRA and TPB models. The TRA, (Trandis (1980), applied in Kaba (2013) and Lai (2017), and cited in Anisman (2016) and Lai *et al.* (2017), suggests that behavioural intentions are influenced firstly by an individual's attitudes and personal beliefs; and secondly, that how an individual perceives attitudes of others

in their peer group or community may be influenced by cultural values and social norms. TPB includes a third factor that impacts on an individual's behavioural intention and links belief to behaviour. It is suggested that an individual may be influenced by a perceived (or actual) element of control which may limit or moderate their behaviour, such as previous negative experiences.

Application to the research location

In the research location, nurses and others may be influenced by the factors proposed in the TAM, TPB and TRA theories. Perceived usefulness and perceived ease of use are motivating factors in the acceptance and adoption of ICT, and may explain why some of the nurses have developed varying levels of computer utilisation skills, while others have not. For example, when computer utilisation skills are essential for employment or furthering education their usefulness is acknowledged. Ease of use may be a facilitating factor for some, or conversely may impede others due to technical difficulties or misunderstanding. Perceived negative influencing factors include fears of technology, social or cultural influences or getting into personal debt (Anisman, 2016). Some of these examples are cited as reasons by informants not to engage with technology. However, some have adopted technology with enthusiasm by demonstrating positive behaviour change and by positively influencing and supporting others.

Diffusion of technology innovation theory

Rogers' (2003) diffusion of technology theory was developed to establish how the adoption of innovations in technology occurs over time. The theory leading to technology adoption was developed from Rogers' expansive review of diffusion research, which identified five stages leading to adoption. The stages in the process are:

- **Knowledge** – when an individual is exposed to innovations and seeks further information before proceeding or dismissing at this stage. Rogers (2003) queries whether a need leads to innovation, or whether the innovation creates a need.

- **Persuasion** – the individual forms a positive or negative attitude towards the innovation. Anticipation of future advantages to adoption may also be a factor.
- **Decision** – whether to adopt or not may depend on trying it out, or the positive influence of others e.g. peers, or workplace decisions to adopt. In some circumstances persuasion to adopt may come after the decision to adopt is made by e.g. the organisation.
- **Implementation** – is the active stage where teething problems may occur, problems are addressed and behaviour changes. The length of this stage varies.
- **Confirmation** – changes become normalised and assimilated into the organisation and individual skill set. Consequently, changes may occur in other areas impacted by ICT adoption e.g. email replaces post and ultimately the postal system. This change may then be received negatively by some, creating a dissonance. There are examples of the impact of technology in the research location discussed below.

These first three stages are 'culture-bound', and the pressure for adoption may be more acceptable in 'collectivist' cultures, whereas 'individualist' cultures are more about choice (Rogers, 2003, pp.178-179). In addition, the innovation decision process of Rogers' model has been compared with Prochaska and DiClemente's stages of change model with potential to further conceptualise these theories (Rogers, 2003).

The stages in the process resulted in terminology which reflects the stages of adoption in each population, with percentages given as a guide based on research (Rogers, 2003). People are described as: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). Rogers (2003, p.174) also outlines the attributes of early adopters as having 'more education', 'higher social status', 'more exposure to mass media' and more 'social participation'. Factors that influence the speed and success of adoption are the type of innovation, the social system, time, methods of communication (e.g. word of mouth), and whether the adoption is by a country, community, organisation or individuals. The

cost of an innovation in financial terms or the social cost are additional factors in the diffusion of technology theory. Rogers also refers to a critical mass of adopters, at which point the adoption becomes established (Lai, 2017; Rogers, 2003). According to Rogers (2003), social systems play a major role in the diffusion of innovations, the structure of which affects the rate of adoption. This can also be a main barrier to change and affects the speed of change.

Application to the research location

The model can be applied to the research location, at organisational level, to help understand the stages of technology adoption over time. The first stages of knowledge, persuasion and decision making are established. The implementation phase is where technical issues are managed and behaviour changes. The researcher would suggest that the national infrastructure is in place that allows the local systems to function, but it is still subject to local issues. The adoption cannot be fully implemented and 'confirmed' until the individual computer users engage fully with the technology.

At individual level, there is evidence from the research location that the adoption of computer technology is in its early stages, with examples of early adopters and the beginnings of an early majority of computer users. A growing number of nurses and health workers need to use computers in the workplace, and therefore it is becoming a requirement for the job. Other factors that influence nurses to use computers are personal motivation, participating in education or CPD activities. When applied to mobile phone use, the evidence suggests that a critical mass of users exists with a high percentage of the location site population owning mobile phones. Teleconferencing is also at the very early adopter stage of development in the research location.

Synthesis of models

Each model has been individually analysed, but there is potential to synthesise all three models in association with cultural theories and apply this to this research. Culture is a significant influencing factor in each model.

The Hofstede *et al.* (2010) model determines the influence of culture on ICT adoption through analysis of country orientation and distinguishes between characteristics of western and developing countries. It also has application at individual level and recognises many cultural layers of influence. Davies' (1989) TAM is used to explain computer usage at individual level and perceptions of use. How individuals are influenced by cultural and social pressures is thought to be significant in developing countries. Rogers' (2003) diffusion of technology innovation theory is applied to establish how adoption of technology innovation occurs over time. These first three stages are 'culture-bound', and the pressure for adoption may be more acceptable in 'collectivist' cultures, whereas 'individualist' cultures are more about choice (Rogers, 2003, pp.178-179). The concept of collectivist cultures is also part of Hofstede *et al.*'s (2010) diffusion of innovation theory, which reflects the culture of developing countries and the potential rate of adoption.

Conclusion

The chapter began with a study of Uganda and applies a PESTLE framework which incorporates political, economic, sociocultural, technological, legislative and environmental perspectives in which to situate a critical appraisal and synthesis of selected policies and cultural and underpinning theories.

The literature review initiated a further exploration of policies and theories. Walt's (1994) theoretical model of policy was applied to the analysis of context, content and process of policy making and their impact on national ICT infrastructure development, skills development and CPD of nurses. The chapter concludes that policies provide the vision and plans to implement the ICT infrastructure in Uganda and recommends ICT skills development for health care workers. However, nurses have a well-developed national policy (MHU, 2016) with no direct mention of CPD or computer skills development. Simultaneously, the UNMC (2016) have produced a CPD framework document to guide CPD implementation and accreditation. There appears to be no coordination between these publications.

Rogers' (2003) theories of ICT diffusion and Davies' (1989) technology acceptance model provide explanations of individual adoption, while Hofstede *et al.*'s (2010) dimensions of national culture consider the national impact of culture on ICT diffusion and adoption. There is potential to synthesise these theories into a composite framework of influencing factors on ICT adoption and skills development.

Chapter four explores a range of epistemological positions, paradigms and alternative qualitative methodologies to justify ethnography as the chosen methodology and ethical approach. Spradley's (1979, 1980) developmental research sequence (DRS) is presented as the preferred research framework for data collection and analysis and focuses on cultural understanding and perceptions.

Chapter 4: Ethnography as a Chosen Methodology

Introduction and aims of the chapter

This chapter presents ethnography as the chosen methodology used in this study by examining its origins, characteristics and changing application in contemporary society (Silverman, 2014). The chapter contextualises ethnography in the interpretive paradigm and justifies Spradley's Developmental Research Sequence (Spradley, 1979, 1980) as the system of choice applied to the conduct, data collection, analysis and presentation of this research and ethical considerations. The chapter integrates a theoretical approach with examples from the field to provide an applied narrative, rather than a purely descriptive account of methodology, methods and application, to ensure comprehensive coverage of relevant content (Denscombe, 2010; Silverman, 2013).

Theoretical underpinnings of ethnography and application to the study

Ethnography is the chosen methodology for this thesis, and thus requires some historical context to explore its latter-day application. Ethnography has its roots in cultural anthropology which was one of the earliest forms of qualitative research. Social anthropologist Malinowski in the early 20th century described ethnography as more than a method or methodology and more than participant observation. Fieldwork and participant observation are central to the methodology, as well as interviews and inclusion of demographic data, to contextualise the cultural setting and to make comparisons with other cultures (MacDonald, 2007).

The term ethnography evolved from the Chicago School of Sociology in the 1920s and 1930s, where students were encouraged to get out of the classroom and experience the city through observation and listening by using 'eyes and ears', leading to a series of studies on social organisation and the lives of people (Holloway, 2005; Lassiter, 2005; Silverman, 2013). Ethnography is an example of a research methodology that has evolved and diversified over the last century to embrace shorter periods of observation. For example, some studies have become more focused (Roper & Shapira, 2000), with limited immersion in the field or research setting yet have the characteristics of traditional ethnographies. This

research concurs with this change with its specific focus on CPD and nurses' utilisation of computer technology and with shorter immersion in the field. Other sources of information also contribute to ethnography, such as an ethno-methodological critique of statistics and similar sources external to the research setting in the field (Hammersley & Atkinson, 2007). Ease of travel, enhanced communication and use of technology allow for 'interrupted' immersion, as opposed to 'uninterrupted' immersion in the field, and at the same time identify complexities in the interpretation of associated data (Munhall, 2007; Wolcott, 2001). Wolcott (2001) suggests that it is the length of engagement, rather than the actual length of time in the field, that influences the knowledge accumulated. In the case of this research, periods of immersion in the field totalling eight weeks occurred over a four-year period between 2009 and 2012. Communication was maintained via email, Facebook and study visits to the UK by informants.

Ethnography includes the description of a group with identified common threads such as religion, social relationships or organisational style. An ethno-historical description describes the cultural reality of the present as the result of historical events in the past (Morse, 1994). This definition is particularly relevant to understanding this current ethnographic study, which is heavily influenced by the wider cultural context of the indigenous people and the post-colonial British missionary cultural context in which the hospital in the research setting was established in the 1950s. To the present day, there is a continuing link to its origins in the UK, which remains influential both financially and in the context of religious practice.

Ethnography broadly comprises learning from people, cultures and societies over a period of time (Spradley, 1979, 1980). During the timescale of this research, from 2009 to 2012, the complexity of interrelationships between people, culture and society became apparent through participant observation, conversation, data collection and analysis. O'Reilly (2012, p.86) suggests that ethnographic research is a 'special methodology' whereby researchers learn about other people's lives by talking with them, by observing, asking questions and participating in their lives over time through the process of participant observation. Spradley (1980)

acknowledges that ethnography has emanated from cultural anthropology and is concerned with understanding life from the 'emic' or insider perspective of the 'native' or 'informant' and learning from people rather than studying them. In addition, Roper and Shapira (2000, p.4) describe the tension within the dual role of being both an insider and an outsider who brings the 'etic' perspective to fieldwork. This is reconciled through 'reflexivity' to bring a deeper understanding and objective insights into the research, by acknowledging any bias by the researcher and undertaking respondent validation (Parahoo, 2006).

Research contextualisation

Daly *et al*. (2007) promote the value of qualitative research by designing a model to encapsulate the hierarchy of evidence exclusively to assess qualitative health research which provides evidence for practice or for policy. This results in four levels of qualitative hierarchy being identified. These are categorised as level one, generalisable studies; level two, conceptual studies; level three, descriptive studies; and level four, single case study (Daly *et al.,* 2007). This ethnographic study utilises participant observation, interviews and focus groups and is considered a descriptive observational study according to Daly *et al.*'s (2007) framework (see Table 4.1).

Table 4.1: Hierarchy of evidence: A framework for ranking evidence evaluating healthcare interventions

	Effectiveness	**Appropriateness**	**Feasibility**
Excellent	Systematic reviews Multi-centre studies	Systematic reviews Multi-centre studies	Systematic reviews Multi-centre studies
Good	RCT Observational studies	RCT Observational studies Interpretive studies	RCT Observational studies Interpretive studies
Fair	Uncontrolled trails with dramatic results Before-and-after studies Non-RCTs	Descriptive studies Focus groups	Descriptive studies Action research Before-and-after studies Focus groups
Poor	Descriptive studies Case studies Expert opinion Poor methodological quality	Expert opinion Case studies Poor methodological quality	Expert opinion Case studies Poor methodological quality

(*Source*: Redrawn from Daly *et al*., 2007)

Hammersley (2008) argues that within the interpretive paradigm, qualitative approaches have become more scientific in their approach, and therefore more acceptable as valid and reliable methods of research. Positivists who recognise empiricism as being only what is directly observable as facts exclude concepts such as anxiety, well-being or life satisfaction. By contrast, post-positivists accept that although such phenomena are not observable, they can be studied through self-reporting provided the tools used are valid and reliable (Parahoo, 2006). Indeed, interpretivists now consider that they provide an equal alternative to positivism. What has been accepted are that the two paradigms share common beliefs, and that it is possible to explain and understand human behaviour when studied in context. They also concede that researchers may be influenced by their preconceptions, which must be acknowledged through reflexivity to overcome implications of bias when undertaking data analysis, discussion and drawing of conclusions from the data (Parahoo, 2006). It is important therefore to have regard for reflexivity and to make a declaration of the researcher's cultural understanding, acknowledging the differences between their own and informants' backgrounds and experience to avoid bias. In the case of ethnography, and in this research, a descriptive narrative, rigorous research methods and analysis are declared as part of the research (Hammersley, 2008).

LeCompte and Schensul (2010) describe seven characteristics of ethnographic research and distinguish it from other forms of qualitative research by its focus on cultural interpretation through participants or informants. The characteristics of ethnography are that it is carried out in a naturalistic setting; involves face-to-face interaction with participants; represents an accurate reflection of the participants' perspectives and behaviours; uses inductive, interactive and recursive data collection and analysis to build local cultural theories; uses multiple data sources (only qualitative in this study); frames human behaviour and belief in a socio-political and historical context; and uses the concept of culture as a lens through which to interpret results.

Speziale *et al.* (2007) summarise six common characteristics central to ethnographic research. These are: the researcher as an instrument; fieldwork; the cycle of data

collection and analysis; reflexivity; the focus on culture; and cultural immersion. The first three are common to other qualitative methodologies as described by Creswell (2013). What sets ethnography apart is its focus on the culture of the people, cultural immersion during fieldwork and the process of reflexivity. Reflexivity is included to offset the tension that occurs between two positions – that of the researcher being a researcher or 'outsider', and the researcher's close involvement as an 'insider' i.e. as a 'member' of the culture and people being studied. Brewer (2000) connects the interpretation of data and writing up of research with the process of reflexivity and having regard to influencing factors on the research. This requires acknowledgement of the researcher's preconceptions, the relationship between the researcher and informants, the influences within the research setting, and how these may have influenced the research process.

Terminology may differ between the main methodologies. *Participant* is the descriptive noun used for an individual who is the subject of research. The participant may also be the researcher who becomes part of the research itself as either an observer, participant observer or through active participation in a research setting. Informant is a term used in ethnographic studies in relation to a person who is a source of information (Spradley, 1979), and is applied in this research.

Justifying the choice of ethnography, rather than selecting alternative research methodologies, also requires a comparison between their key distinguishing features. These are summarised in table 4.2.

Table 4.2: Summary of characteristics of ethnography, phenomenology and grounded theory

	Ethnography	Phenomenology	Grounded theory
Background	Anthropology and sociology	Philosophy, psychology and education	Sociology
Purpose	Identifies and explains cultural settings.	Examines the meaning of lived experience.	Develops a theory grounded in data from the field.
Unit of analysis	Studying a group that shares the same culture.	Studying several individuals who have shared the same experience	Studying a process, an action or an interaction involving many individuals.
Data collection (some or all may be used)	• Participant observation • Individual interviews • Focus groups • Documents • Artefacts • Prolonged field work	• Individual interviews • Focus groups • Documents, observations and art	Mainly interviews with 20–60 individuals (Creswell, 2013). Sometimes observations.
Data analysis	Varied. Analysing data through description of the culture sharing group. Organised into domains, generation of taxonomy to identify structures in culture and themes about the group.	Analysing data for significant statements, meaning units, textual and structural description, and description of the essence of meaning. Gaining sense of whole phenomena by rereading transcripts and listening to interviews.	Analysing data through open coding: identifying units of data and organising it into categories and subcategories. Axial coding: making connections between and among categories. Selective coding: identifying central category to explain phenomena.
Outcomes	Rich description of culture and patterns of behaviour. May generate theory.	Exhaustive description of meaning and essence of experience. May generate theory	Theory generation

(*Source*: Adapted from Creswell, 2013)

Discussion of methodology

Although there are clear differences between ethnography, phenomenology and grounded theory, they share the common features of qualitative research (Creswell, 2014; Speziale *et al.*, 2007). The methods of collecting data may be similar, whether it is by observation, interview or focus groups. Although interview questions and techniques vary with the methodology, the methods of data examination and analysis in both phenomenology and grounded theory have commonalities with ethnography.

Whichever way data is generated, all data must be read in detail. This follows on from data transcription following participant observation, recorded interviews or focus groups, and other sources such as field notes and reflective diaries. It is an iterative-inductive process whereby analysis of data is ongoing and interlinked (Bryman, 2016; Hammersley & Atkinson, 2007; O'Reilly, 2012;). For example, in this research returning to the field enabled further questions to be asked of the same informants for clarification and exploration, and new informants to be identified. The data collected from field notes, observations, interviews and focus groups coincides with Spradley's DRS: making an ethnographic record and identifying domains in data analysis (Speziale & Carpenter, 2007; Spradley, 1979, 1980).

Triangulation

Denzin and Lincoln (1998a) propose there are five main areas of triangulation: data triangulation; investigator triangulation; theory triangulation; methodological triangulation; and interdisciplinary triangulation. The first three are identified in this research. Combining methods of data collection within one methodology, such as participant observation, interviews and focus groups, and integrating these sets of data strengthens triangulation (Denzin *et al.*, 1998a, 1998b; O'Reilly & Kiyimba, 2015).

Le Compte and Schensul (2010) propose that triangulation provides corroboration from key informants who hold different perspectives on the subject or hold different positions in a project. This aspect corresponds to Denzin *et al.*'s (1998a) triangulation of theory. For example, information obtained from documents such as

project proposals or historical documents can be cross-checked with data collected by observations in the field or interviews, as is the case in this research.

Ethnographic methodological approaches

Spradley's DRS (1979, 1980) is the method of ethnography implemented in this research. It combines a descriptive and systematic approach that is justified through reflexivity, and by examining the characteristics of different forms of ethnography. From the 1980s onwards, ethnographic methodology has evolved in its application (Silverman, 2016) and is classified according to its philosophical position as: classical; systematic; critical; or interpretive or hermeneutic (Morse, 1994; Speziale *et al.,* 2007). Alternatively, Creswell (2013) and O'Reilly (2009) describe ethnography as being either realist (or descriptive), or critical.

Classical ethnography

Speziale *et al.* (2007) and Morse (1994) summarise classical ethnography as requiring considerable time to be spent in the field with a focus on behaviour, with information obtained from key informants in order to describe everything about the culture. Maintaining objectivity and credibility of the ethnographer is crucial to the classical approach.

Systematic ethnography

Systematic ethnography focuses on the structure of the culture in contrast to the classical approach (Morse, 1994; Speziale *et al.,* 2007). Spradley (1980) defines ethnography as the activity of describing culture and learning about and understanding people, rather than just studying them; this view leans towards the systematic and descriptive ethnographic perspective. This is demonstrated through his method of comprehensive inquiry using the developmental research sequence for data gathering and analysis (Speziale *et al.*, 2007; Spradley, 1979, 1980).

Interpretive or hermeneutic ethnography

Interpretive or hermeneutic ethnography explores the meanings of observed social interactions in detail (Denzin, 1997) by attaching meaning to an individual's own understanding of reality (O'Reilly & Kiyimba, 2016). Geertz (1993) describes how

cultural understanding is achieved through 'thick description' by collecting very detailed data over long periods of time to aid interpretation (Morse, 1994; Speziale *et al*. 2007). This contrasts with the descriptive approach taken in this research that reflects the verbatim responses of the informants; these are collected into domains of similarity rather than interpreted by the researcher to find alternative meaning. The approach therefore cannot be described as interpretive or hermeneutic ethnography.

Critical ethnography

Critical ethnography is described by O'Reilly (2009, p.51) as "…an approach that is overtly political and critical, exposing inequalities in an effort to effect change". For example, the aim may be to expose hidden agendas and describe power relationships. Findings are used to achieve reform or change within the areas under observation, or to address inequalities and empowerment of its people (Creswell, 2013). Demographic data analysis is also used to explore or to expose inequalities through combining factual data with the experience of informants (O'Reilly, 2009). Although this current research does not overtly develop a critical ethnographic approach, it does consider the political contexts both nationally and locally, and the extent to which they influence the experience of the informants and relationships within the research setting through observation and interview.

Realist or descriptive ethnography

Creswell (2013) describes the traditional approach used by cultural anthropologists as realist or descriptive ethnography, which is an objective account tending to be written in the third person, tailoring views and observations through edited quotes and interpretation. This traditional descriptive approach described here reflects the approach taken in this research.

Spradley (1979) contends that there are many ways to undertake ethnographic research. Each research setting is in any case unique, which has led to a lack of agreement among researchers concerning specific techniques and procedures to follow when undertaking ethnographic research and analysis. As Spradley (1980) and Silverman (2016) describe, the degree to which the ethnographer participates

varies. In more recent expressions of ethnographic research, access to the field or physical research location is less frequent when research takes place off site such as during non-participant observation (Silverman, 2016) or when internet research is undertaken.

Spradley (1979, 1980) developed the DRS which provides a systematic and descriptive approach to presenting ethnographic research. This method was chosen for this research because the systematic approach and DRS sequence reflect the iterative stages of the research process undertaken through fieldwork events and subsequent analysis: the data was collected and analysed between visits, which allows the data to be presented as it unfolded. Through a reflexive approach, the research is presented as a true descriptive account of the informants' experiences with cumulative analysis of the data and identification of cultural themes following Spradley's DRS.

The truthfulness and transferability of ethnographic research

A criticism of ethnography is that it is difficult to transfer findings to other settings because of the uniqueness of each study. However, when research studies with similar aims and criteria are presented, they have the potential to be transferable (O'Reilly, 2009). O'Reilly (2012, p.225) contends that:

> ethnographic research… can still have relevance for a wider population through the transfer of understandings to similar settings, through theoretical explanations that can have wider application, or through overt and modest 'banal' generalisations.

Denzin and Lincoln (2002) and Bryman (2016) maintain that qualitative research should be assessed differently from quantitative research by applying the four criteria of trustworthiness: credibility, transferability, dependability and confirmability. These terms correspond in quantitative research to internal validity; external validity; reliability and objectivity.

Stewart (1998) discusses how ethnographers should draw parallels between scientific enquiry and ethnography to demonstrate equivalence and validity. He compares validity to veracity, reliability to objectivity, and generalisability to

perspicacity. The key points Guba (1981) makes are summarised and reinterpreted to explain how ethnography can be justified as a valid methodology.

The veracity of the research in ethnography is not what has been 'measured' but what the ethnographer has observed or claims to have observed. This brings into question the accuracy of their descriptions of observations, and if they have been subject to interpretation or elaboration. To an extent, challenges to veracity (validity or credibility) can be overcome by the time spent in the field. Modern-day ethnographers tend to spend less time in the field than their historical counterparts; it is therefore understandable that less time is available to establish relationships and to observe at length. However, this can be overcome by the nature of the relationships with informants, the trust developed, and understanding of the cultural setting, and through utilising several methods of data collection (Guba, 1981). Reflexivity of the researcher and reduction of bias are important factors. It is in this way that the 'truth' can at best be closely obtained. However, there are always limitations and restrictions resulting from the setting or field itself, which may include gatekeepers and the informants themselves trying to impose restrictions on access or availability. Other limitations or restrictions may come from the researcher, who may have only partial access to the field or selective perceptions (Stewart, 1998).

In the case of reliability, measurements should be objective and replicable. In ethnography what is difficult or impossible to replicate, according to Hammersley (1990) and Stewart (1998), is participant observation as the informant can be influenced by the presence of the observer (or ethnographer or researcher). Alternatively, the action or activity being observed cannot be repeated. Objectivity – whether the data is influenced by the values and attitude of the researcher – is a key issue. Likewise, if the informant or participant is influenced by the process, it renders their accounts, responses to questions and observable actions unrepresentative and inconsistent, casting doubt on their reliability.

Respondent validation

This further raises the question of how an ethnographer's observations are proven to be truthful and credible. Respondent validation provides confirmation of the truth and credibility of the ethnographer's observations by feeding back the information to informants and others who have some other connection with the study. The informant can then provide confirmation and clarification of the observations. Through self-reflection, reflexivity and acknowledging bias, the researcher can provide a credible narrative and analysis (Stewart, 1998).

The uniqueness of the ethnographic method

In contrast to other methodologies, ethnographic researchers explore the similarities and differences of the human experiences of people who are connected through a shared culture. The researcher and informants may be from different cultural backgrounds and this forms part of the declared awareness of potential bias when undertaking ethnographic research (Speziale *et al.*, 2007). Part of the researcher's purpose is to interpret cultural meanings found within the connected group. For example, this applies specifically to those who live and work at the hospital in the research setting.

In order to achieve an understanding of the culture under scrutiny it is essential to become immersed in the culture to be able to provide a credible analysis. This requires a time of being or living in very close proximity to the people being studied. Again, this contrasts with other qualitative methodologies.

In this study, four periods of two weeks (eight weeks in total) were spent in a four-year period (2009-2012) living and working in the hospital setting, with contact with informants maintained via email and visits to the UK by informants. During the periods of immersion during the field visits, observations, reflections, informal conversations, interviews, focus groups and participation in the culture took place, enabling interpretation and conclusions to be drawn following data collection and analysis.

The developmental research sequence – critique of the method

After discovering Spradley's (1979, 1980) DRS in the literature, a comprehensive search was made to discover where it had been applied previously in ethnographic research. Four studies were found in nursing practice (Koskinen & Tossavainen, 2002, 2003; Parfitt, 1996, 1999). Parfitt (1996) applies the DRS to interviews only in the study and provides constructive comments about the method that produced large amounts of data: the stages were not easy to apply to practice and it was time consuming. Three other ethnographic studies published by Bernstein (2007), Inan *et al.* (2008) and Lee *et al.* (2011) partially apply Spradley's DRS in health and education research and provide a critique of the method.

Three main criticisms of Spradley's DRS are discussed and challenged by Lee *et al.* (2011). These concerns have been raised by several academics and at first sight may influence decisions not to use the method.

The first concern is that cognitive approaches assume researchers cannot take a non-involved perspective in data analysis and therefore unconsciously influence findings and analysis. This is challenged and is overcome by employing a reflexive approach.

Secondly, that Spradley does not adequately distinguish between the individual and culture and sees culture as internal to the individual. The DRS is used to understand the language and culture of the participants through acknowledging verbatim comments and identification of cultural themes.

Thirdly, there is scepticism that semantic analysis can provide access to rich cultural meaning – however, individuals are manifestations of their culture, therefore what they say is situated in the cultural context.

Lee *et al*. (2011) justify the application of Spradley's DRS as it provides a comprehensive systematic approach for describing the language and culture of participants that emanates from their own use of language and experiences.

In this thesis, individuals do express their individual perceptions of culture, and at the same time acknowledge the wider macro cultures that influence professional

development and experience. A reflexive approach is taken and documented throughout the research. In addition, the thesis uses participant observation, interviews and focus group methods, a comprehensive and structured approach to gathering and analysing data using Spradley's DRS, and is considered methodologically appropriate.

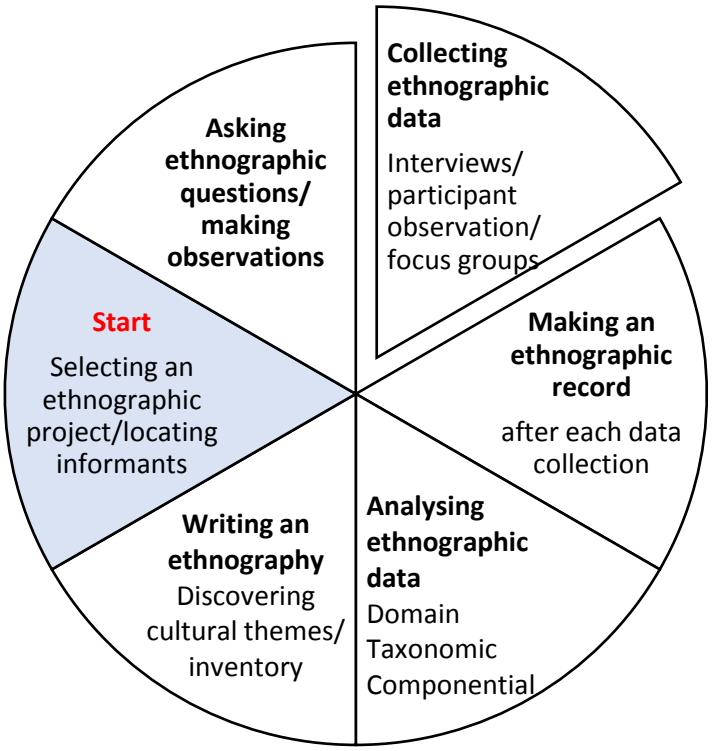
Applying Spradley's DRS

The ethnographic research cycle (Figure 4.1), as described by Spradley (1979, 1980), involves selecting an ethnographic project; asking ethnographic questions; collecting ethnographic data; making an ethnographic record; and analysing ethnographic data. This sequence continues until the researcher has enough information or data (Spradley, 1980). Spradley (1979, 1980) developed a comprehensive 12 step framework for conducting ethnographic research, adding detail to the research cycle. The developmental research sequence (DRS) is followed whether doing participant observation or interviewing informants: the sequence differs slightly in each case, but the analysis of the data obtained follows similar steps.

Spradley (1979, 1980) suggests that the scope of the project may range from a macro to a micro ethnography which focuses on a complex society, multiple or single communities, institutions or social settings. This research focuses on a single community and institution, and the research location is contextualised within the national setting, enabling a greater understanding of the influences of culture, government and health policy as discussed in chapter three.

Spradley (1980) recommends that ethnographers select a project with a single general focus to determine how people use cultural knowledge to organise their behaviour and understand their experience. This fits with the focus of this study which is to understand the cultural influences on the utilisation of computer technology and CPD.

Figure 4.1: The Ethnographic Research Cycle based on Spradley's DRS (1979, 1980) (Redrawn)



The aim is for the ethnographer to explore what the informant feels is important in the setting. This can be undertaken through participant observation consisting of general observations and conversations when entering the field, followed by more focused and selective observations, including interviews and focus groups, as the research progresses.

The following section provides an analysis of the stages of Spradley's DRS applied to participant observation and ethnographic interviews with examples from the research location.

Selecting an ethnographic project and locating informants

To summarise, the ethnographic project is part of a larger capacity building programme described in Chapter 1. The location of this research is a hospital within an isolated rural community in the country of Uganda. The location is contextualised within the national setting to enable a greater understanding of the

influences of government, selected policies and culture on the CPD of nurses and their utilisation of computer technology.

Accessing the field, gatekeepers and sampling strategy

Gatekeepers are usually the first point of contact in a research setting. According to Hammersley *et al. (*2007), they are often senior personnel in an official capacity who have decision making powers to allow or control access by researchers to undertake research. They discuss the position of gatekeepers who may try to be helpful by selecting interviewees or conversely want to control who the ethnographer interviews. If gatekeepers are involved in the research application, they are likely to be more compliant in the conduct of the research. O'Reilly (2012) adds that in less formal settings, gaining access to informants often results from developing personal relationships and tip offs about who to observe or interview and who would provide insight and information useful to the researcher.

In this research, the gatekeepers supported the conduct of the research and selection of those interviewed. Some of the gatekeepers themselves were interviewed, from a position of information seeking and clarification of the strategy, about computer provision, CPD and policy in the organisation, staff access to computers and utilisation and training provision.

Sampling strategy – Selecting informants

An ethnographer seeking informants would normally seek out 'ordinary people' to explore culture as a part of participant observation or interviewing (Spradley, 1979). However, Spradley (1979, p.46) also suggests that an informant should know their culture well ('enculturalisation') or have 'current involvement' in the cultural scene. The ethnographer also learns more from their informants if they are unfamiliar with the culture themselves and can truly demonstrate 'learning from people' (Spradley, 1979). In the setting of this research, most informants have a common occupational thread, that of nurse or administrator in the hospital setting. They are all established within the hospital workforce and living in the local community, satisfying Spradley's (1979) requirements of an informant.

Hammersley and Atkinson (2007) refer to self-selection of informants in participant observation, interviews and focus groups. If sufficient informants do not come forward, then specific individuals who are considered to have specific knowledge or information that would add to the richness of the research are approached and asked to take part.

Fetterman (2010) distinguishes between informants and key actors, depending on the type of information obtained through interview. Fetterman (2010) also refers to having an 'interview strategy' that is having no strategy at all – or rather, remaining flexible about the time, place and technique of conducting the interview. He suggests this may 'enhance the interview' (Fetterman, 2010). For maximum information, the aim is to learn from the informant and be 'natural' in the approach.

In this research, most of the informants interviewed also took part in focus groups, comprising the same group of nurses who were pre-selected by the hospital management team to take part in the CPD programme. Twenty-eight nurses were selected using the following criteria:

- Position in the organisation e.g. senior nurse manager, senior nurse tutor, ward sister or charge nurse and staff nurses.
- Representation from each clinical and teaching area.

This strategy was decided in the project plan (Gidman & Wilson, 2013) so there would be an equal distribution of staff involved throughout the organisation. The aim is for attendee nurses to apply and disseminate new knowledge gained from the CPD programme to other staff in their wards or departments to develop clinical practice. The nurses who were interviewed or took part in focus groups were initially approached as a group, the research explained, and an invitation extended to participate. Most of the group were involved in one or more of the research encounters on one or more occasions (see Appendix 4, table 2). In addition, the researcher interviewed some of the gatekeepers who included members of the hospital senior management team and website technicians for their perspectives. It is therefore important to achieve a balance and to avoid one-sidedness by

interviewing a range of personnel through purposeful sampling (Bryman, 2016; Silverman, 2013). However, in participant observation, although the observations were made in a purposeful way, they also generated unplanned and unanticipated conversations with informants that contributed to the richness of the data.

Methods of data collection

Participant observation – The researcher as an instrument

Participant observation and non-participant observation are research methods that generate data through description of observations in the research setting. The two positions can be illustrated on a continuum between non-participation and complete participation that suggests there is a middle ground. Spradley (1970, 1980), also cited in Walt and Walt (2011), developed categories that described the extent of participation experienced by the researcher in the field.

During the process of participant observation, skilled ethnographers elicit information through informal and friendly conversation (Spradley, 1979). These situations allow questions and conversations to develop without the formality of an interview setting. Field notes enable general observations to be documented and form the basis of future interview questions.

In this research, questions about local cultural practices and traditions are prompted through observation in the chapel; on the hospital ward; in informants' homes; and in the local community. In addition, the ways in which computers are utilised in the workplace and in the home setting are observed *in situ* which prompted questions and discussion.

Although the researcher does not consider herself to be a 'skilled ethnographer', the nature of her professional role and background experience of nurse and lecturer enables communication with individuals on many levels including listening, putting people at ease, and encouraging conversation and participation. These are all transferable skills on which rapport and trust are developed in the field.

The researcher experienced the range of participation during and between field visits and examples are described in table 4.3 below.

Table 4.3: Spradley's continuum of participation categories and definitions (1970, 1980) with examples from the researcher's experience

Non-participation	Passive participation	Moderate participation	Active participation	Complete participation
Occurs when cultural knowledge is gained by observing from outside the research setting without direct interaction with people.	Occurs when the researcher is present in the setting, but acts as an observer or spectator, & does not interact directly with people.	Occurs when the researcher is present, & the people are aware of the research role, but does not actively participate. May include structured observation & very limited participation.	Occurs when the researcher becomes involved with most activities.	Occurs when the researcher becomes part of the group, but continues to make field notes etc. (Differs from 'going native' when the researcher becomes part of the identity of the culture.)
Examples from the field				
Prior to and between field visits. Gaining knowledge from policies, literature and research on culture, computer technology & CPD in healthcare and nursing.	During field visits, both formally & informally when everyday activities are taking place, but the researcher is e.g. walking around or in a vehicle or not interacting directly with local people and staff. Observation of computers *in situ* in the hospital & environs e.g. local internet café, outpatients' department, offices.	Active enquiry & structured observation of daily activities on the wards & school of nursing, including how theory is being applied to practice. Utilisation of computer technology & application of same skills. Informal conversations. Attendance at morning chapel services.	Active teaching role in the classroom setting. Organised skills observations & assessment on the wards. Specific skills teaching concerning use of computer search engines, searching literature, clinical updating & application of new skills. Purchasing from local village shops.	Being invited to social occasions by informants in their own homes, sharing meals and entertainment. Utilisation of computer technology in the home environment.

Informal conversations

Informal conversations occur spontaneously during participant observation and form the basis of future formal interviews as a way of exploring informants' knowledge, experiences and opinions. O'Reilly (2012) describes this as a passive approach to interviewing. When informal situations occur in participant observation, it is a way of 'seizing the moment' and provides the ethnographer with the opportunity to listen to an informant and hold a conversation of significance. In this situation, the researcher asks questions of the informant in a sensitive way that may not be possible in a more formal setting. It paves the way to building a positive relationship between the informant and the researcher, whereby at a point in the future more detailed conversational exchanges and probing may be appropriate.

Spradley (1979) maintains that experienced ethnographers will obtain most of their data through participant observation and casual conversations. The ethnographer may introduce "ethnographic elements" (Spradley, 1979, pp.58-60) or specific questions to guide the conversation in a manner that is unobtrusive. It is important to retain a relaxed approach and not overdo the purposeful questions as they may inhibit the respondent's spontaneity. O'Reilly (2012, p.116) also refers to "guided conversations" as a specific ethnographic approach to informal interviewing and conversations.

Field notes

Because informants may disclose information not discussed in a more formal interview, it is vital that field notes are written contemporaneously to document the informal conversation as accurately as possible. Hammersley and Atkinson (2007, pp.141-142) point out that "Field notes are always selective: it is not possible to capture everything." However, Spradley (1980) advises paying attention to the 'language principle', differences such as cultural or professional terminology; the 'verbatim principle', writing down verbatim quotes; and 'the concrete principle', using concrete description: together, these enable a more accurate expansion of the field notes after the event. These principles were applied to field notes written in this research.

Field notes are characteristic of ethnographic research, but their value as a reliable source of data and accuracy is questioned by Van Maanen (2011). Field notes are written at any stage, consisting of the researcher's observations, accounts of daily events, information and observations in the field (Fetterman, 2010). They should be made as soon as possible to make any claim on accuracy. However, with the use of audio recording during interviews and focus groups, for example, the verbatim exchange is preserved, and largely replaces the traditional practice of making extensive field notes in these circumstances. However, when the informant's consent is given to an interview, but not to making a digital recording, it is essential to make detailed notes contemporaneously. In this research, there were several formally arranged interviews where recording did not take place, so detailed notes of the conversations and key points were made during and following the interviews adhering to Spradley's principles. Fetterman (2010) also emphasises the need to organise field notes and all data collected and aligns to Spradley's 'ethnographic record' (Spradley, 1979, 1980).

Individual interviews

Distinctions are made between different forms of interviewing. Interviews in ethnographic research are informal or formal, and take place with individual informants or in focus groups. Individual approaches may occur as spontaneous informal or guided conversations, or more formal planned events (O'Reilly, 2012).

Schensul, Schensul and LeCompte (1999) discuss the characteristics of the ethnographic interview technique: they are usually semi-structured and open ended to allow for deeper exploration of the topic. This allows the researcher to increase their own knowledge on a subject and at the same time acknowledge the informant's own expertise on the subject under scrutiny. This also helps in relationship building between informant and researchers as the research progresses. Method of interviewing are exploratory in the first instance to identify domains and to deconstruct them to potentially discover new information. Unfocused interviews allow the informant time to express themselves without being led or prompted too much in their responses. Thus, the questions are looser and open ended and lead to disclosure of unanticipated information. As research

progresses, further interviews become semi-structured interviews to clarify the validity of domains, identify any new domains and explore in greater depth. In this research, informants occasionally disclosed information that was not directly related to the research and consequently not transcribed. Additionally, informants generated information not previously anticipated that added to the richness of the data.

Interviewing informants

Spradley (1979) maintains that when interviewing it is important to find an informant with certain qualities, such as being able to talk about their culture, being involved or located in the field site, being available for more than one interview over a period of time, having enough time to spend doing the interview, and being able to respond to questions without offering their own analysis. However, this last point may be difficult to ascertain in advance. This sequence has been flexibly adhered to in this research.

Formulating ethnographic interview questions

How questions are formulated will depend on what the ethnographer wants to find out. In this research, different types of question were introduced over a series of interviews that were semi-structured with open-ended questions to elicit a free flow of information. Spradley (1979, pp.59-60) describes three types of ethnographic question: 'explicit purpose', 'ethnographic explanations' and 'ethnographic questions'. In this research all question types were asked at different stages of interviewing with some examples given below:

- Explicit purpose – are direct and designed e.g. to discover nurses' experience with computer technology and CPD and to elicit cultural knowledge of the informant.
- Ethnographic explanations – in this research explanations are regularly given to clarify the purpose of the questions and the wider project. Informants who were interviewed more than once were encouraged to build on previous interviews, provide further explanations and talk about influences of culture.

- Ethnographic questions – Spradley (1979) describes over 30 kinds of ethnographic question that fall into three broad categories, asked at different stages of the research:
    - Descriptive questions, about activities and what people do, are designed to develop a rapport and elicit information. They include more general 'Grand tour' and more detailed 'mini tour' questions;
    - Structural questions enable the ethnographer to identify different domains;
    - Contrast questions help to establish different meanings used by the informant in componential analysis.

These types of question are formulated broadly before an interview and asked as guide or prompt questions as the interview progresses. Spradley's (1979) interview technique was adopted in this research where formal questions are preceded by general greetings as ice breakers.

The questions are explained to the informant, as is why they are being asked. The ethnographer's lack of knowledge on the subject is offered as an explanation to put the informant in a position of knowingly having superior knowledge about a subject, giving them confidence to express themselves. The informant may be initially guarded in their responses, but as the relationship develops feel able to express themselves more freely. In this research, the initial notes and records from participant observation form the basis of broader 'grand tour questions' and more specific 'mini tour' questions asked in interviews or focus groups. Spradley (1980, p.33) describes this stage as the "bridge between observation and analysis".

Focus groups

Focus groups are one of the research methods used in this research, but Spradley (1979, 1980) does not address the conduct of focus groups or analysis of resulting data specifically. Alternative authors were sought to clarify understanding of the method and its use in ethnographic research including O'Reilly (2012), Schensul *et al.* (1999), Liamputtong (2011), Silverman (2017) and a series of research papers by Doody *et al.* (2013).

Focus groups take on various formats according to how and why they are used (Liamputtong, 2011; O'Reilly, 2012). O'Reilly (2009) distinguishes between the purposefulness of ethnographic focus groups and other forms of focus group that are used by governments, for example, to gather political opinion and comment on new policy proposals. What makes focus groups a useful method for gathering qualitative research data, according to Silverman (2016), is that a group discussion can be focused around a set of topics, facilitated by the researcher asking open and broad questions. The researcher adopts an active listening and facilitative approach, only seeking clarification and steering the discussion if the discussion goes wildly off the topic. This ensures that the discussion is not influenced by the views of the researcher, who is able to acknowledge their reflexivity. In addition, O'Reilly (2009) suggests that it allows the researcher to explore areas identified when analysing previously gathered research data, for example from interview, focus groups or participant observation, when the discussion is more purposefully directed to gain clarification. This is defined as respondent validation where the group are asked to comment on previously obtained data and informants are reminded of what was previously said (Bryman, 2016).

In the research location, undertaking focus groups allowed a collective response from a group of informants, to explore and collect information, and encourage debate. For example, the influence of culture and local practices in relation to use of computer technology was explored. The final focus group allowed for respondent validation to offer confirmation and clarity on subject areas raised previously. Information was presented in general terms and anonymously to avoid recognition of individual informants.

The timing of an organised focus group and how it is introduced to informants by the researcher is crucial in how effective it is at obtaining the most relevant information. The timing should be mutually convenient to suit clinical staff. This can be negotiated with managers and those gatekeepers who gave permission for the research to be undertaken. For example, the first set of focus group data was obtained after a lecture in the classroom, so clinical staff could choose to take part. In the second set of data collection, permission was sought to undertake the focus

group in the chapel after the morning service, and staff involved in the CPD programme were invited to take part. Focus group numbers are consistent with O'Reilly's (2012) ideal number of between 4 and 12 persons.

Focus groups can be dominated by one or two participants especially if the focus group is too small (Doody, Slevin, & Taggart, 2013). This is anticipated and managed by the researcher, by establishing ground rules agreed with the group to allow for any intervention, in which case it should be discussed in the analysis. In this research there is evidence of non-participation by a minority of nurses in one focus group (O'Reilly, 2012) and this is discussed in chapter five.

Data analysis following Spradley

This research follows Spradley's systematic approach to analysis of ethnographic data obtained from interviews, participant observation and informal conversations. Spradley (1979, 1980) describes four stages of ethnographic analysis leading to identification of cultural meanings: domain analysis, larger units of cultural knowledge; taxonomic analysis, the internal structure of domains; componential analysis, searching for differences within a domain; and theme analysis – searching for relationships between domains and how they are linked broadly to culture. Combining different types of analysis leads to finding cultural meaning. LeCompte and Schensul (2010) also describe deconstructing domains in their approach to data analysis and this would equate to Spradley's (1979) domain, taxonomic and componential analysis. LeCompte and Schensul (1999, 2010) also state the distinguishing feature of ethnographic analysis is that it is iterative or recursive.

Domain analysis

This stage involves analysing data collected in the field through a 'domain analysis' to start to understand social situations, including the activities undertaken by the people in the research setting. As a result of this initial analysis, greater understanding of cultural influences is sought through undertaking further observations, asking questions and by making further domain analyses. This pattern emerged through the progress of this research.

According to Spradley's (1980) systematic approach, the first stage of the ethnographic research cycle of analysing ethnographic data should be completed before proceeding to further data collection and additional focused observations. In this research, the second set of questions was generated from the first set of analysed data and participant observation on subsequent field visits.

Further to this, Spradley (1980) contends that questions are generated out of initial participant observation. This fits well with this research as data collection took place over four field visits. The first two field visits consisted of observation and participant observation which generated detailed field notes and reflections. The third and fourth visits included individual interviews and focus groups to explore the questions generated through the initial visits. The interviews and focus groups were digitally recorded, with some exceptions. In addition, obtaining ethical approval and initial reading and preparation for undertaking this research was completed prior to undertaking data collection by interview and focus group.

Following the completion of a domain analysis, domain categories are constructed by undertaking further observations and data collection on subsequent field visits. As a result, in this study a greater understanding of the culture and 'cultural patterns' started to develop. Hammersley and Atkinson (2007) alternatively suggest generating concept categories and subcategories to discover cultural meaning. This would correlate to Spradley's domains and domain categories, and taxonomies following a similar process of qualitative research analysis.

Taxonomic analysis

This is a more in-depth analysis to identify how domains fit into larger categories of analysis. Such distinctions are validated by further questions, interviews or focus groups etc. For example, nurses who attended the CPD programme could be categorised into domains by types of nurse e.g. teacher, theatre, paediatric, midwifery etc. This in turn is further categorised into patient groups they care for, or educational background. Alternatively, nurses could be grouped as part of a larger system such as being based in the main hospital or school of nursing. Again, this is linked to the utilisation of technology depending on the location and job role.

Further refining of the data through componential analysis assists in the identification of "dimensions of contrast" (Spradley, 1980, p.128).

Componential analysis

"Componential analysis is the systematic search for attributes associated with cultural categories" (Spradley, 1980, p.131). The stages of making a componential analysis involve selecting appropriate domains; identifying 'dimensions of contrast' from the cultural domains; and creating an inventory or table of the contrasts discovered. This means differences in informants' values, beliefs and perceptions are illustrated through this analysis. In this research, dimensions of contrast emerged after the third and fourth visits and were explored further in the two additional informant interviews undertaken in the UK in 2013. These final interviews allowed selected questions to be asked leading to further insights into different aspects of culture (Spradley, 1979, p.178).

Cultural themes

Spradley defines culture as "the acquired knowledge people use to interpret experience and generate behaviour" (Spradley, 2006, p.11). When studying culture, it is important to distinguish between cultural behaviour and cultural knowledge, or what people do and what people know. This is differentiated in the data analysis. In addition, cultural artefacts, or what people make and use, are a third consideration. These determine how the first two aspects of human experience are constrained depending on the culture (Spradley, 1980, 2016). Artefacts identified in this research are computers or mobile phones and associated technology.

Culture is described at two levels which include the small details and the wider cultural landscape (Spradley, 1979, 1980). Cultural themes are described through an in-depth analysis of the selected domains, which are subdivided into categories. From this, recurrent patterns within and between domains are identified in the collected data. The patterns constitute elements in the culture that are tacit or implicit (Speziale *et al.*, 2007)

Some cultural themes are easily identified and understood, though most remain at tacit level and are not expressed easily in words but are identified in the behaviour of the informants. To complete the theme analysis, ethnographers become immersed in the data to either identify patterns not previously discovered or to explore them in more detail. This involves grouping domains into taxonomies and searching for links and similarities (Spradley, 1979, 1980).

Spradley (1979, 1980, pp.152-153) identified six universal cultural themes:

- Social conflict.
- Cultural contradiction. There may be an 'official image' and an 'insider view'.
- Informal techniques of social control. This includes conforming to values and norms in the social situation.
- Management of interpersonal relationships.
- Acquisition and maintenance of status. This may, for example, be through a high degree of religious devotion.
- Problem solving. What are the problems? Culture is a tool for solving problems.

These universal themes are applied in the analysis of the culture and contribute to a summary of the cultural scene as part of this research.

Ethnographic research is situated in a cultural context, and the ethnographic approach is to describe culture in a broader and individual context by considering the activities and actions of people and how they are influenced by it (Spradley, 1980). This may or may not result in the emergence of new theories about culture, as this depends on the level of data interpretation, but hypotheses may be identified for further study (Germain, 2001, cited in Speziale, 2007).

Using software to organise data

O'Reilly (2009, 2012) discusses the application of software to the sorting and coding of data where transcripts are pasted into qualitative analysis computer programmes. In this research, MAXQDA is used to sort out the transcripts into subject sections. The process involves pasting each transcript into the programme,

doing a line-by-line reading of each transcript and coding segments of each script. By organising the data in this way, analysis and comparative analysis can take place between the responses of informants. In the case of focus groups, different informants can be coded within the transcripts and again comparisons can be made. In qualitative research, the software helps to organise the data, not analyse it. After data is coded and an explanation attached to the codes, they are grouped together into themes for more focused coding. The ethnographer then analyses the coded data manually, aiming to identify patterns and meanings. Again, this corresponds to Spradley's (1979) domains and taxonomies.

In this thesis, MAXQDA was used to organise the first set of interviews and focus group data to identify themes prior to its analysis. Following this, Spradley's DRS was also applied to the data and the researcher concluded that applying MAXQDA conferred no advantage to the organisation of data over Spradley's DRS. Therefore, MAXQDA was not used again. However, using the software and the results of the application are discussed in the data chapter.

Ethical approval for study

The permission for ethical approval is contained in Appendix 1. The following paragraph is a summary of the research process undertaken and research principles adhered to. The overseeing of research in Uganda is carried out at two levels, the first at national level directly by the Ugandan National Council for Science and Technology (UNCST) with specific responsibility for research and development (R&D) coordination, large projects and clinical trials. Secondly, it is carried out at local level by local research committees (LRCs) which have delegated powers and responsibility for the local conduct of research; this second case applies in this research.

The Ugandan National Guidelines for Research Involving human subjects as research participants (UNCST, 2007) were scrutinised to ensure that correct procedures were followed in the conduct of the research. Permission was obtained from the local hospital management committee (HMC) in the research location which acts as an LRC and satisfies the criteria laid down by the UNCST (2007). For

example, the criteria include a committee of at least five members with varying backgrounds, and with sufficient experience and expertise amongst its members to ensure an adequate review of research activities and safeguarding of research participants.

> The ethics of research related to health care in developing countries' (NBC, 2002) offers four basic principles to reflect on by any person undertaking health care research in developing countries: the duty to alleviate suffering; the duty to show respect for persons; the duty to be sensitive to cultural differences and the duty not to exploit the vulnerable.
>
> In addition, universal research ethics principles were adhered to, to protect the rights and welfare of research participants in accordance with the four basic research principles including: Respect for Persons, Beneficence, Non-maleficence and Justice. (WHO, 2012, 2013).

The above principles were acknowledged when designing this research and adhered to when conducting it. Points of consideration include the political, economic, environmental, social, cultural and technological influences on health and healthcare infrastructure.

Prior to the field visit in March 2011, the medical director of the hospital was approached by email and a copy of the research and ethics proposal sent. Approval was confirmed in principle by the medical director who suggested a meeting on arrival at the hospital with the executive medical team to discuss and formally approve the research. This was agreed by email. A meeting took place with the executive directors of the hospital on the first day of the field visit in March 2011 where the purpose of the study was explained, a copy of the ethics proposal provided, and information given about the research process, the intended interviewees and focus groups, and how this fitted in with the overall project, CPD programme and research. Verbal agreement was given by the committee, at that juncture, to undertake the first set of interviews and focus group data collection (see Appendix 1). In November 2012 a similar approach was made to the then new medical director, and formal written and verbal agreement was obtained by letter emailed from the HMC; this approved the second set of interviews and focus group data collection which took place in December 2012 at the same time as the overall project evaluation.

Further enquiries were made to THET who advised that the university's Faculty of Health and Social Care Ethics Committee approval is only required as there are no patients involved in data collection. However, since gaining ethical approval in 2011 and 2012 there have been additions to the university process of gaining ethical approval for research undertaken outside the UK. These refer to country-specific approval requirements obtained in accordance with Ugandan requirements at the time of ethical approval being granted.

Conclusion

The first part of the chapter introduces ethnography as the chosen methodology for this thesis and an overview of the research paradigms, methodologies and methods is presented. Taking a realist or descriptive and systematic approach to ethnographic methodology is justified through comparing and contrasting with classical, critical and interpretive approaches. All approaches share similar features of qualitative research, but what sets ethnography apart is the context of the research and its focus on the culture of the people. The second part of the chapter includes background to the research methods used and how the research is conducted by application of Spradley's (1979, 1980) DRS. The research sequence was applied to participant observation, interviews and focus groups to illustrate data gathering and domain, taxonomic and componential data analysis and discovering cultural themes. The final part of the chapter includes applying for and obtaining ethical permission from the university and the research location in Uganda to carry out the research. Chapter five takes a chronological approach to obtaining, analysing and presenting the data following Spradley's DRS. The data illustrates the 'emic' perspective elicited through participant observation, interviews and focus groups illustrated with verbatim quotations and synthesis of accumulated data from each field visit.

Chapter 5: Data Collection and Analysis

Introduction to the chapter

The previous chapter (Chapter 4) reviewed qualitative research methodologies and justified the use of ethnography and Spradley's Developmental Research Sequence (DRS) as a framework in which to conduct, organise and analyse this research. Chapter 5 provides a critical analysis of the process of data collection and analysis during four field visits to Uganda between September 2009 and December 2012, applying Spradley's DRS (1979, 1980). Data collection methods are outlined in table 5.1, which indicates when they were utilised on each visit. Table 5.2 summarises each informant's specific contribution to the study. The chapter takes a sequential approach to each data collection method, analysis and subsequent emerging themes, to illustrate the developments in ICT and application in the research setting during the research. Chapter 6 will explore in depth the themes that emerged from this research.

Table 5.1: Field trips and data collection methods

	Field trip	Data collection via	Informants/observation
1	September 2009	Participant observation Informal conversations	**Participant observation** Local nursing and administrative staff in the hospital and school of nursing. **Informal conversations** Opportunistic informal conversations during participant observation. **Individual interviews (recorded and unrecorded)** Purposeful sampling for individual interviews from nursing and administrative staff. **Focus groups** Self-selected focus group participants from nursing CPD programme.
2	February 2010	Participant observation Informal conversations	
3	April 2011	Participant observation Informal conversations Individual interviews Focus groups	
4	December 2012	Participant observation Informal conversations Individual interviews Focus groups	

Summary of informant contributions to the study

In total, 43 informants including nurses, doctors and administrators, contributed through one or more of the data collection methods. Each informant was anonymised by allocating an individual number and a general occupational identity. For the purposes of clarity, a matrix of informants was developed to identify the method by which each informant contributed and is summarised in Table 5.2. A more comprehensive matrix of informants is included in Appendix 4.

Participant observation was a feature of each field visit and during these activities a total of 26 noted informal conversations took place. Five informants spoke to me informally on two occasions.

A total of three focus groups took place which were digitally recorded. A total of twenty-two informants took part in the first two focus groups on the third visit, and twelve informants took part in the third focus group on the fourth visit. Of those who took part in the third focus group, seven informants had previously taken part in either focus group I or 2.

A total of twelve individual semi-structured interviews were digitally recorded. Five were conducted on the third field visit and five on the fourth field visit; a further two recorded interviews took place off site in the UK during 2013 with informants who had moved to other hospitals in Uganda, both of whom were undertaking degree studies in the UK. In addition, a further seven unrecorded semi-structured interviews took place on the fourth visit which were contemporaneously written up in note form. This is a total of nineteen recorded and unrecorded interviews with thirteen individual informants. Of those informants interviewed, five were interviewed on two occasions and one on three occasions.

The following table indicates when and how each informant contributed.

Table 5.2: Individual informant contributions

Informants numbered 1-43	Participant observation	Informal conversations	Focus groups 1, 2 & 3		Individual interviews (recorded)	Individual interviews (unrecorded)
September 2009 FIRST VISIT	Field notes/ reflections	2, 3, 10, 19, 28, 31, 37, 38, 41, 42, 43 (Total 11)	None		None	None
February 2010 SECOND VISIT	Field notes/ reflections	7, 28 (Total 2)	None		None	None
April 2011 THIRD VISIT	Field notes/ reflections	7, 10, 17, 23, 24, 27, 32, 37, 38 (Total 9)	FG1 8, 9, 16, 17, 18, 19, 21, 25, 30, 38 (Total 10)	FG2 1, 2, 4, 6, 10, 11, 15, 26, 31, 33, 34, 35 (Total 12)	17, 23, 27, 37, 38 (Total 5)	None
December 2012 FOURTH VISIT	Field notes/ reflections	5, 13, 22, 29 (Total 4)	FG3 4, 14, 16, 19, 21, 26, 31, 33, 34, 36, 39, 40 (Total 12)		17, (20 + 38), 26, 31, 38 (Total 6)	2, (7 + 12), 19, 21, 27, 37 (Total 7)
2013 in UK					28, 38	

Structure of the chapter following Spradley's DRS

The chapter is structured chronologically and follows the sequence of visits to the research location. The first part of the chapter follows Spradley's DRS (1980) for participant observation and analysis, and considers participant observation undertaken on each field visit and how this contributed to the ethnographic interview process and focus group questions. The second part of the chapter includes the third and fourth field visits, follows Spradley's DRS (1979) for ethnographic interviews, and provides a more detailed critical analysis of interview data. Spradley's DRS principles are also applied to the analysis of the focus group data.

Spradley (1979, 1980) does not specifically provide an analytical framework for focus group data, but the principles of Spradley's DRS for interview data and analysis are applied and supported by O'Reilly (2012), Schensul *et al.* (1999) and others detailed later in the chapter. The interview and focus group data were systematised using MAXQDA, a database for organising qualitative data, and is applied later in the chapter. Spradley's DRS consisting of twelve steps or stages for conducting participant observation and ethnographic interviews is detailed below (Spradley, 1979, 1980).

Table 5.3: Stages in conducting participant observation and interviews using Spradley's DRS (1979, 1980)

Participant observation		Ethnographic interview	
1	Selecting an ethnographic project	Locating an informant	1
2	Doing participant observation	Interviewing an informant	2
3	Making an ethnographic record		3
4	Making descriptive observations	Asking descriptive questions	4
		Analysing ethnographic interviews	5
5	Making a domain analysis		6
6	Making focused observations	Asking structural questions	7
7	Making a taxonomic analysis		8
8	Making selected observations	Asking contrast questions	9
9	Making a componential analysis		10

Participant observation		Ethnographic interview	
10	Discovering cultural themes		11
11	Taking a cultural inventory		
12	Writing an ethnography		12

The research cycle for ethnographic research, as described by Spradley (1980), summarises and encapsulates the stages of the DRS, and emphasises the iterative approach taken during each stage of the research. This model is applied to each of the four field visits in the research location, leading from initial grand tour questions to more focused observations, data collection through participant observation and interviews, recording the events in field notes or by photographs, and analysis of the data relating to each visit. Data analysis from each field visit then forms the basis for the next visit and the direction of the research.

Cultural representation

When a researcher is writing about a culture that is different to their own, McCurdy and Spradley (2005) are concerned that the culture is represented objectively and that the research demonstrates validity. They suggest three ways in which to maintain objectivity: first, by acknowledging that the researcher's own culture and experiences are different from those being studied; secondly, by including some information about themselves; and thirdly, by sharing their research with the informants. These three aspects have been demonstrated as follows:

The researcher is from the UK but has striven, as far as possible, to ensure that participant observation demonstrates emic and etic perspectives in an objective interpretation of experience in the research location and authentic transcription of conversations and observations. Personal information is included in the first chapter, providing a background to the research. In all visits where data has been collected, the purpose of the research is explained, and information and data collected shared with informants in subsequent visits. For example, I was able to present an overview of data collected with each individual interviewed to build on what had been said previously. I was also able to draw on focus group data for further exploration with individual informants and in the final focus group. This also

demonstrates an iterative approach to data collection by revisiting previous data before collecting more. In this way respondent validation is achieved (Bryman, 2016; Denzin *et al.*, 2002). In addition, Fetterman (2012) refers to data collection and analysis from the emic and etic perspectives. He discusses collecting data from the emic perspective that represents the 'insider view' and multiple realities. This concept is fundamental to understanding that different individuals have different experiences and opinions, but all represent a reality. This is demonstrated through informants who originate from different cultures such as Uganda or the UK, who present very different perceptions of reality as illustrated in this research. According to Fetterman (2012), ethnographic data is usually collected from the emic perspective but analysed from both the emic and etic perspectives, combining the insider view with social analysis through sympathetic cultural interpretation.

Participant observation following DRS

September 2009, February 2010, April 2011, December 2012

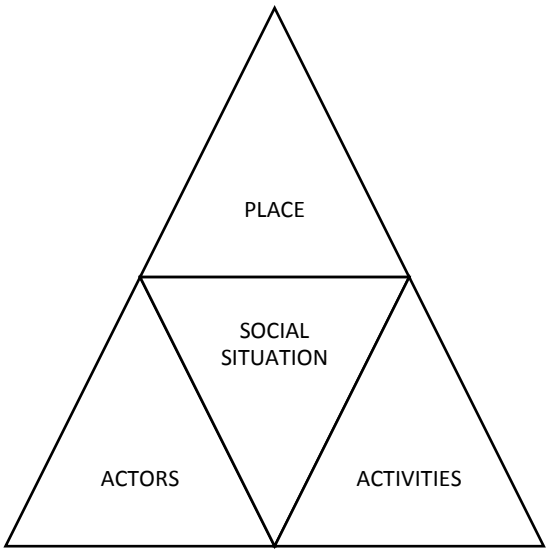
Selecting an ethnographic project and gaining permission

Spradley (1980) recommends that ethnographers select a project with a single general focus that is to determine how people use cultural knowledge to organise their behaviour and understand their experience. This fits with the focus of this study which is to understand the political and cultural influences on the utilisation of computer technology. The aim is for the ethnographer to explore what the informant feels is important in the setting. The initial research consists of participant observation including more general observations and conversations when entering the field. Participant observation took place at each field visit when opportunistic engagement in informal conversations with informants was noted down. The cumulation of observations formed the basis of more focused and selective observations during subsequent visits, and contributed to formulation of semi-structured questions for interviews and focus groups explored later in the chapter.

Spradley (1980) describes the location, or setting, of any research using specific terminology. The 'social situation' is characterised by the place, its actors and

activities. The researcher is located in the 'place', the 'actors' or people are observed or interacted with, and the 'activities' are observed or participated in (see Figure 5.1). Groups of activities are also known as events. How far actors share activities, such as computer access, may not be evident until the research unfolds. In this research, most of the actors are nurses, doctors and administrators within the setting, and the shared activities involve computer utilisation and associated activities. The term 'informant' is reserved specifically for those actors, as described by Spradley (1980), who make direct contributions through informal conversations, interviews and focus groups. Fetterman (2010) also refers to the terms 'actor' and 'key actors' as being interchangeable with 'informant'. However, he prefers the term 'actor' as an alternative to 'informant', which he contends is associated with stigma due to its historical roots from an anthropological perspective. The term informant is used throughout this research to denote those who impart information through the data collection methods; and unlike Fetterman's (2010) definition, all informants are considered 'key actors' rather than a few of them, due to their professional status and direct involvement in the CPD programme in the research setting.

Figure 5.1: The social situation and three primary elements (Spradley, 1980)



Accessing the field and gaining permission to undertake research

Gatekeepers are usually the first point of contact in a research setting. The gatekeepers are often senior personnel in an official capacity who have decision

making powers to allow or control access by researchers to undertake research. Hammersley and Atkinson (2007) discuss the position of gatekeepers who may try to be helpful by selecting interviewees or conversely want to control who the ethnographer interviews. If gatekeepers are involved in composing the research application, they may be more flexible in the proposed conduct of the research. O'Reilly (2012) observes that in less formal settings, gaining access to the field may be a result of developing personal relationships and tip offs about who to observe or interview, and about who would provide insight and information useful to the researcher.

In this research, the gatekeepers supported the conduct of the research and method of selection of those interviewed. They were involved in developing the initial capacity building proposal and gave specific permission to undertake PhD research. Some of the gatekeepers themselves were interviewed about computer development in the organisation, and the staff access, utilisation and training involved, from a position of information seeking and clarification of the training strategy. Thus, they became informants.

Doing participant observation

Spradley (1980) describes the continuum of being an observer through to being a complete participant as developing over a period of time (Table 4.3). It may take longer to assume the role of researcher in a totally different environment where the participant is initially learning about the culture. This social situation is typical of my field visits to Uganda where, over the four visits, I was immersed in delivering teaching and observing utilisation of technologies and nursing activities in the cultural setting. The role of participant observer became more developed over time, as I developed relationships with informants and become involved with both professional and social activities in the setting. Spradley (1980) also refers to insider and outsider experiences where observing and being a participant observer can go on simultaneously as well as singly, and the activities become integrated as the cultural setting becomes familiar. In addition, introspection and reflection become more important in understanding what is being observed and the data being gathered, furthering understanding of the cultural dynamics.

Making an ethnographic record and descriptive observations: Field notes

As part of the process of making an ethnographic record and descriptive observations, notes were made contemporaneously or as soon as possible after the event. Where I was purely an 'unobserved observer', I made more extensive notes simultaneously. When I became more involved, as a participant observer, I made shorter notes that were developed later with key words and verbatim comments based on conversations of interest and relevance that took place during everyday contact. Spradley (1980) advises that 'condensed notes' should be made during or after every fieldwork event and then expanded. Again, as Spradley (1980) suggests, a diary was kept alongside these notes with dates and times of key events. This also served as a reflective diary where thoughts and feelings were acknowledged.

During four field visits, different levels of participant observation were ongoing. I gained greater cultural insight into the activities of the people from both a social and professional perspective. This provides a background in which to contextualise informal conversations, and interview and focus group data, from later field visits. As I became more attuned to the location and its people, descriptive observations became more purposeful with more focused questions asked during conversation. This led to a plethora of notes and observations being made, some of which were ultimately discarded.

Descriptive observations

During the first field visit, and subsequent visits to Uganda, data was gathered though writing descriptive observational notes and personal reflections utilising the observer/participant observer continuum. At first this consisted of descriptive observations of Uganda whilst travelling from east to west across the country, and more specifically in the social setting of the research over time. I had a note book where I recorded observations of people, conversations, places and activities, and took photographs to illustrate relevant scenes and to preserve their memory to enable reflection and confirm observations later (Pink, 2009). In later field visits, I made digital recordings of interviews and focus groups, and had access to local documents. Some photographs have been included in this thesis.

The first stage of each field visit, on arrival in Uganda, consisted of 12-hour road journeys that allowed me to make general observations of the infrastructure of towns, villages and roads along the route, repeated on each visit. Kampala was a busy city full of contrasts between a centre of modern streets, buildings and hotels, and an outer shanty town area of streets gridlocked with traffic, market stalls, open drains and constant noise, making for slow progress before joining the main highway. Many street signs provided insight into health issues: 'HIV testing here', 'Gynaecological services', 'Veterinary products', along with advertising hoardings for mobile phones and political parties, for example. Travelling west from Kampala there was intermittent ribbon development of towns and villages along the highway, with stalls of vegetables, meat carcases, severed animal heads, mobile phone shacks, petrol stations, schools and places of worship. When crossing the equator, there was evidence of tourism with coffee shops and souvenirs. There was also evidence of numerous representative religions including places of worship used by the Church of Uganda and other Christian based denominations such as Catholics, Baptists, Pentecostalists, Seventh Day Adventists and Jehovah's Witnesses. The Islamic faith was also in evidence with numerous mosques *en route*. Christianity (85%) and Islam (15%) is the representative percentage religious split in Uganda (World Population Review, 2017). Roads deteriorated as we travelled westward and eventually leaving the main highway we moved onto unmetalled dirt roads for a further two-hour drive to our destination.

The journey and our understanding of Ugandan culture were enhanced by the driver (Informant 3) who also acted as a guide. On the first journey, he discussed his family life and experiences which led to him moving from the north to the south of Uganda twenty years previously. These included atrocities inflicted during the civil war by the Lord's Resistance Army (LRA) including destruction of whole villages, murder, child abduction, indoctrination of boy soldiers and corruption. This first-hand account contributed to the wider cultural understanding of the country, later supplemented by background reading.

Figure 5.2: Photos of our driver, our stop at the equator and a street scene in Kampala

Participant observations in the research setting

During my stay in the hospital community I became immersed in the local culture and how life was organised professionally and socially. Observations were made in both professional and social situations. My involvement began as a complete observer in the first instance; this activity is also referred to by Spradley (1980) as 'passive participation'. As I became more familiar with the local community, I moved through moderate and active participation to complete participation in some areas, as the research progressed with each field visit (Table 4.3). My aim was to observe lifestyle and activities in the field, both socially and professionally, and to speak with informants informally as opportunities arose, asking 'grand tour' questions relating to the activity or event. For example, on the hospital tour in the first visit, I was able to enquire about treatments and patient care without being obtrusive, because of shared professional backgrounds. I was also able to observe the presence or absence of computer technology, which in the first visit was absent on the wards.

Meetings with the senior management team

It is customary at the beginning of each visit to meet with the hospital senior management team to present the aims and objectives of the visit, and to discuss teaching plans and clinical support to be offered during the visit. In addition, I provided information about the purpose of my research and established times for interviews and focus groups during the third and fourth field visits. The senior

management team included the medical director, nursing director, head of the school of nursing, accountant, chaplain, other senior nurses, and UK university and hospital staff, some of whom contributed informally and formally during each of the visits. Various meetings were held with individual senior staff during each of the field visits. Again, these everyday encounters allowed some informal exploration about computer utilisation and personal experiences of computers, which led to the identification of potential informants for formal interviews in the third and fourth visits and the crafting of questions.

Chapel attendance is central to the hospital community, and essential for all staff to attend each morning at shift change. Hospital news and notices were read out and the senior nurse allocated the workload to the day staff after the service. This is an important part of the day's routine where information is given and received, and any visitors are invited to speak and state their purpose at the beginning of their visit and to summarise achievements at the end of their visits. The services consisted of hymns, readings and prayers with full congregational participation. This daily ritual prompted me to seek out a conversation with the hospital chaplain on the first visit to explore the role of the church in the community.

On the final day of the first visit, each of the visiting team said a few words. I said the following:

> *…thank you to everybody for welcoming us into your hospital and your community. We not only came here to teach you but to learn from you about your ways…*

September 2009 – The first visit

Introduction

The first visit to Uganda was an observational and fact-finding experience which allowed familiarisation to occur within the wider social setting, the village and the hospital, and with the professional staff. The researcher was primarily engaged in teaching part of the CPD programme, which involved applying different teaching and learning strategies to encourage the nurses to participate in learning, rather than being a passive recipient. General participant observations and opportunistic informal conversations took place throughout the visit, and a summary follows that provides an introduction to the cultural scene of the research experience.

Informal conversations

Eleven informal conversations took place, noted in my field notes, during participant observation relevant to furthering my understanding of the culture, professional activities and lifestyle of the local population. These conversations allowed exploration of individual experiences of using computers, particularly for educational purposes and aspects of nursing practice, and development of an understanding of the prevailing culture. The hospital tour provided a comprehensive insight into these areas through visits to each of the wards and departments, where I met many of the staff who were attendees on the CPD programme, several of whom became informants and contributed to various parts of my research.

Hospital tour

Professionally, I was taken on an observational tour of the hospital with a senior nurse, Informant 2, on my first field visit. Grand tour observations were made, described by Spradley (1980, p.77) as “being shown around their… place of business”, such as a hospital. The tour of the hospital allowed me to engage in informal conversations with the senior nurse and opportunistically with other hospital personnel, both to explore the extent of the use of computers in the workplace and to understand the hospital system, treatments and hierarchy by asking ‘grand tour questions’ (Spradley, 1980). The questions were initially fact-

finding and spontaneous in the first instance to elicit general, baseline information. I was surprised by the number of mobile phones in use; many staff had them to communicate with other members of staff as landlines were not always available. They also communicated with their families, especially if they had young children as female staff could take a break to go home within the confines of the village, to breast feed their babies. This is part of hospital policy, confirmed later by Informant 10. These staff would employ child minders to look after their babies or children during their shifts. This tour contributed to my understanding of the prevailing nursing and medical culture, as well as the cultural practices of patients and relatives. I asked questions about treatments, ward routines and numbers of inpatients. This also gave me the opportunity to enquire and observe the location of any computers in the hospital. At this time, they were limited to the outpatients' department, the pharmacy, and the IT and management offices, with no evidence of use on the wards. The tour encompassed psychiatric, paediatric, medical, surgical, orthopaedic, maternity and isolation wards, as well as A & E, theatres, outpatients, pharmacy, laundry, physiotherapy and rehabilitation units where there was no evidence of computers at this time. Some areas were very crowded and dark with unpleasant odours. The hospital was also very busy with more evidence of relatives than patients.

Unlike hospitals in the UK, families were responsible for general washing and feeding of their relatives; they usually stayed with their relatives, sleeping either under their beds or on mattresses outside in the hospital grounds. They would travel from many miles around, travelling for days in some instances, firstly to bring their relative and then to stay with them throughout their attendance. Cooking was carried out by the families in communal kitchens at the back of the hospital. This consigning of general patient care and cooking to the relatives is a complete cultural contrast to nursing practice in the UK.

Conversations following the hospital tour

A senior nurse tutor, Informant 38, had registered for a degree programme at the UK university as an extension to the CPD programme. He had access to a laptop computer, and had additional information supplied to him, by me, on a USB stick to

enable him to work offline as well as accessing the university intranet. He did express difficulties accessing the university intranet:

> *…at times the server speed and internet are slow, and no signal is available in heavy rain….*

These facts were potential barriers to online learning at the hospital site, hence the provision of learning materials in the first instance.

A senior nurse on the psychiatric ward, Informant 31, expressed his enthusiasm for access to computers and the internet, but had no current means of personal access unless through *'friends'* or at the local primary school where special arrangements were made for use by hospital staff. In addition, lack of textbooks in the library was highlighted as an issue and only limited information, often outdated, was available about drugs and treatments. He specified that:

> *…access to up-to-date information (through the internet) would enhance my (and others) practice.*

An unprompted example was given in relation to patients on psychiatric wards, that:

> *…patients sometimes have to be restrained and shackled if their prescribed drugs are not available.*

These comments contributed to my realisation that there was frustration that practice potential could not be achieved, because computer access was not easily available, library materials were very limited, and drug treatments were sometimes unobtainable.

A senior nurse, Informant 19, explained that the incidence of HIV in young women in the surrounding area was increasing and that regular testing took place when they attended the outpatient clinic. This may be for antenatal or contraceptive purposes. Prostitution was also said to be increasing:

> *…they sell their bodies for sex….*

This was explained fully in a formal interview in December 2012.

A meeting and conversation with two other senior nurses, Informants 10 and 28, informed me of the current hierarchical structure of the hospital staff, nursing training system and organisation of the school of nursing. The observations on the hospital tour were also supported by information obtained from Informant 10, including the breast-feeding policy for staff returning to work after maternity leave. Nurses are supported to breast feed, and according to Informant 10, 99% of returning staff breast feed. The conversation also included comments on the availability of library facilities, which are meagre, and on computer access for general nursing staff and students, which is limited. The comments made by Informant 10 on facilities available were previously voiced by Informant 31, and began to form a familiar pattern.

Informant 28 also commented that she hopes the CPD programme for nurses would help to:

> *…deliver new knowledge and develop new skills on the wards… and… students will be willing to learn new approaches, but some staff would be more difficult.*

This remark alerted me to potential challenges and barriers to learning, including computer skills, that may arise in the field.

The final conversation I arranged was with the chaplain (Informant 43) who explained the centrality of the church in every aspect of hospital life – that it was the foundation of the community. He expressed his support of computer development and had access to a computer in his office. Interestingly, he had studied business in the UK and enquired about pursuing further educational options online. This prompted a discussion on types of course available and the potential for further study options for nursing staff. The research by Muriira *et al*. (2012) demonstrated that the level of engagement in life-long learning and development of computer skills by nurses is influenced by their level of education. This is a point discussed in more detail later in the research.

Social activities

I was invited, as part of a group, to several social gatherings for afternoon tea, snacks and dinner at individuals' houses, and a party on the final day of our first visit. These events gave me an opportunity to observe local customs and provided insight into the culture, such as the preparation and eating of local foods and participating in traditional entertainment, including dancing and music. These social events prompted interesting conversations, our hosts often enquiring into western lifestyle and culture. This enabled reciprocal questions to be asked unobtrusively of a similar kind, both descriptive and more specific, corresponding to Spradley's grand tour and mini tour questions (Spradley, 1980). I asked questions that were initially descriptive and superficial to elicit information for clarity. These became more focused as more detailed information was sought. These activities were generously convened by the local nursing workforce and contributed to developing subsequent trusting relationships. In the following visits, questions became more specific and descriptive, based on previous observations and conversations. This was to help discover 'folk terms' as used by the informants, and to generate analytical terms to be used by the researcher in the first steps towards a domain analysis (Spradley, 1980).

In contrast, I and other members of the visiting team were invited to homes by some of the management team, several of whom were English missionaries on secondment from the UK. We were often asked about the rationale and motivation for our visits. The response to these questions emphasised the agreed partnership approach and academic position of the researchers, nurses and educationalists in the fully funded and ethically approved CBP, CPD and research programmes. At times there appeared to be dissonance between the religious perspective and the academic and nursing activities. This will be further discussed following the data analysis.

These encounters contributed to my increasing appreciation and understanding of the culture, lifestyle, nursing and internet facilities, as well as the sensitivities around being respectful of the community, their lifestyle and beliefs. This visit paved the way for the second visit to the research site, where I would make more

focused observations in these areas based on information generated through observation and participant observation. Gathering data through participant observation and general encounters and conversations with hospital staff in the research location informed an initial domain analysis (Spradley, 1980). A summary of informant contributions is found in table 5.4.

Table 5.4: Summary of conversations with informants, 1st visit

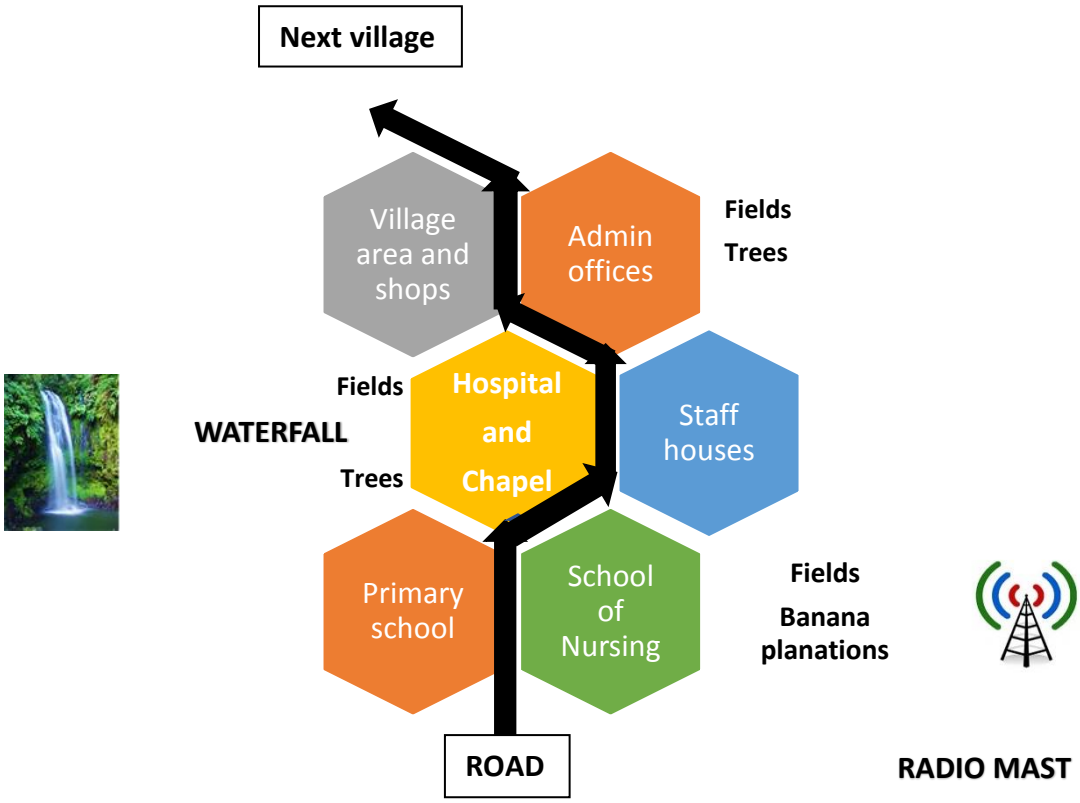
Informant	Occupation/ role	Summary of conversations generating folk and analytical terms
2	Senior nurse (Missionary) Hospital tour	Hospital tour, wards and specialties, care roles of nurses and relatives including washing and cooking, use of mobile phones, location of computers, staff breast feeding policy. Cultural practices.
3	Driver	Family life and experiences, recounts of the civil war and atrocities.
10	Head nurse	Hospital structure and hierarchy. Breast feeding policy.
19	Senior nurse	Increased incidence of HIV and prostitution.
28	Head SON	SON structure, training system. Library facilities. Computer access. Challenges and barriers to learning.
31	Senior nurse	Accesses computers through friends or at primary school. Lack of textbooks, limited and outdated information. Enthusiastic about using computers and the internet to enhance practice.
37	Medical director	Role in the hospital.
38	Senior nurse tutor	Undertaking a degree programme by distance learning. Has a laptop computer, USB stick. Server speed slow, no signal in heavy rain. Barriers to learning.
41	Accountant (Missionary)	Role in the hospital.
42	Nurse (Missionary)	Nursing experience in the hospital and community.
43	Chaplain	Centrality of the church in hospital life and community. Computer development. Personal development. Nursing development and online options.

Making a domain analysis

Each of the four field visits was time limited and provided a separate snapshot of the research location separated by six, fifteen and eighteen months respectively. Therefore, each visit provides specific sets of data on which to make a domain analysis followed by a more in-depth taxonomic and componential analysis of the data. The first set of data obtained comprised participant observation and the preliminary writing of an ethnographic record summarising field notes and informal conversations. This reflects the ethnographic research cycle and stages of the DRS (Table 5.3 and Figure 4.1). The aim of the domain analysis is to search for cultural patterns and meaning in the data gathered through detailed examination of observations made and informal conversations (Spradley, 1980). Eleven informants including nurses, senior nurses, tutors and administrators were identified in the first visit, and contributed via informal conversations. In addition, some of the informants were participants in the CPD programme. This was significant because they were directly exposed to new areas of learning through the CPD programme and use of computers for learning.

The social situation is revealed through descriptive observations of the activities, the people and location, and is the first step towards being able to identify cultural meaning through finding patterns in behaviour and knowledge via analysis of the data (Spradley, 1980). The social setting was observed including the geography of the village and location of the hospital, school of nursing, staff housing, general village housing, and shops which consisted of local traders in small wooden huts; these were contextualised in the wider country setting of Uganda. The detailed observations and encounters with informants lead to greater understanding of the culture, and identification of emerging cultural domains and patterns through listening to their descriptions and observing behaviour. The following figure (5.3) represents the village layout or 'social setting'. The setting provides a focus and structure to people's lives who live and work in the village area, and within that lies the cultural scene that is uncovered through the process of participant observation.

Figure 5.3: Representational map of the local village area or 'social setting' drawn from observation



Identifying domains

A domain includes an overall or cover term used to describe a group of similar categories. The cover term and categories make up the domain. There are different types of domain, described by Spradley (1980) as folk, mixed or analytic domains which may reflect an event, an object or activity leading to cultural understanding through further analysis. The 'folk domain' includes the language or folk terms used by people in social and professional situations, specific to the culture, to describe specific events and activities. The analytic domain is where folk terms are generated by the researcher when no specific folk terms are generated by informants (McCurdy *et al.,* 2005; Saldana, 2016). Specific informants in this research described events and activities such as access to education, access to and using computers, availability of library facilities, types of hospital staff and facilities, nursing practices, and lifestyle. However, the domains and generated terms are mixed in that they are generated through both the informants and the researcher.

The list of terms is not exhaustive and reflects social and professional aspects of the culture. The folk terms are derived from observation and informal conversations, leading to the formation of cover terms for each domain. They contribute to the identification of cultural patterns and of semantic relationships between the categories used in each domain (Fig. 5.5). Spradley (1979, 1980) and McCurdy *et al*. (2005) define a semantic relationship as the 'link' that connects each category in the domain. They propose that semantic relationships are either universal or informant-expressed. The domains initially described can be attributed to universal types of semantic relationship, and examples are given in Table 5.6.

The following domains and categories are generated through in-depth reading of the field notes and conversations, summarising key terms (see Table 5.4) and attributing them as identified in Figure 5.4.

Semantic relationships

To make a domain analysis, the semantic relationships are identified between each category or term. In each domain, semantic relationships between the title or cover term and included terms are found to be an indication of the professional, social and cultural scenes (see Table 5.4). For example, the domain of 'hospital staff' includes categories (folk or analytical terms) such as nurses, senior nurses, tutors, doctors, administrators and other types of staff. The staff are linked together in a semantic relationship in that they are all 'kinds of hospital staff'; the relationship reflects the hospital hierarchy and professional roles undertaken by staff, and is an example of 'strict inclusion'. The 'hospital staff' domain and hierarchical relationships that exist between staff also reflect a mixed cultural matrix comprising staff mainly indigenous to Uganda and those pertaining to the UK.

Figure 5.4: Examples of domains and categories identified in the first visit (including their semantic relationships)

Hospital staff	Nursing practice	Education/Learning	Computers/ICT	Library	Lifestyle
• Senior nurses • Nurses • Senior tutors • Tutors • Administrators • Doctors • Drivers, porters, maintenance etc	• Drug treatments • Care models • Patient care • Role of relatives • Staff breast feeding policy • Mobile phones • HIV/prostitution	• CPD • New knowledge and skills • Personal development • Degree courses • Online learning • Internet access • Library	• Types of access • Time/place • Ownership • Training • Computer locations in hospital • Internet access • Mobile phones	• Books/reading • Learning • Limited range • Out of date • Improve practice • Internet access	• Chapel • Daily worship • Social activities • Music • Dancing • Types of food

'Kinds of hospital staff' **'Strict inclusion'**	**Kinds of treatment' & 'Care administered to patients'**	**'Reasons for doing' 'Rationale'**	**'Places for doing'**	**'Location for action'**	**'Attribution'**

Other examples of domains and semantic relationships were found during the hospital tour, and reflect a variety of activities and events relating to nursing practice, education and learning, computers and ICT, the library and lifestyle. Each domain contains lists of categories associated with the cover term. 'Nursing practice' included 'kinds of treatments and care administered to patients' and again the semantic relationship is 'strict inclusion', which provided a valuable insight into cultural differences in nursing practice. The domains of 'computers/ICT' (a virtual place) and 'library' are 'places for doing' and locations for action identified through educational staff and those participating in the CPD programme. These provided an understanding of IT systems and learning facilities. The domain of 'education and learning' is based on a 'reason for doing', in this case achieving qualifications are the 'rationale'. The 'lifestyle' domain contains broad categories which are attributes or characteristics of lifestyle, and is an example of shared activities and events across the social setting including the chapel, social events and types of food. The lifestyle categories could also be domains and expanded to reflect much more detail. Each of these domains has been aligned to universal semantic relationships and analytical terms, and are examples of informant-expressed relationships that emerged from the observations and conversations influenced by the prevailing culture.

Spradley (1980) refers to 'cultural complexity', meaning that every observation, however small or time limited, accumulates into a much larger picture which may contain too much information, therefore a selection must be made. By undertaking the initial domain identification and creating a diagrammatic representation of the social situation, the cultural complexity became apparent, leading to a selected taxonomic analysis (see tables 5.7, 5.8 and 5.9) following the second visit after more data had been collected.

March 2010 – The second visit

Introduction

The second visit to the research location followed on seven months later. Based on the first visit, a continuing period of participant observation ensued based on making more focused observations informed by the domains initially identified. However, there continued to be opportunistic observations and conversations, as well as seeking out of specific informants, to explore the culture, lifestyle, and computer facilities, provision and access by staff in more depth. Two significant informal meetings and conversations took place, which directly related to preparation of the research proposal.

In this visit there was overall a greater ease of presence and conversation with informants who were generally very welcoming and looking forward to the visit. The feeling of positivity and optimism was evidenced as nurses attending the CPD programme seemed enthusiastic and keen to contribute in the teaching sessions and demonstrate their learning. The hospital senior management team were also pleased with the progress of the CPD programme, as there was evidence of improved contact between the wards and the school of nursing, and better organisation of ward systems including shift handover, medicines management and documentation which was part of the objectives. There were also more computers on site (Gidman & Wilson, 2013).

More focused observations and informal conversations

Informant 7

A meeting took place with Informant 7, the IT department specialist, and a short report was compiled about the hospital's IT system, internet access and subscription, training and general facilities. In summary, in March 2010 there were 22 working computers in the hospital and seven laptops with Windows XP installed. The technical details such as the bandwidth, server software, ability to conduct videoconferencing and develop telemedicine are dependent on the level of subscription paid, regular updating of the server and maintenance of the local radio mast. However, telemedicine systems are not available in Uganda currently. Further

developments in telemedicine and upgrading of the system to aid diagnosis and treatment are planned, but there was no further progress with implementation of telemedicine by the time of the final visit in December 2012. However, there is evidence of videoconferencing taking place at that time. Implementation of telemedicine is partly dependent on Uganda's progress towards implementing a national communication system and broadband infrastructure (Africa Business Community, 2016). The hospital internet access and intranet provision are also dependent on a private benefactor who pays the subscription. Therefore, there are many uncertainties about the system and service provision, now and in the future.

IT training is part of the curriculum for all student nurses and is provided by the IT specialist. The training consists of two x two-hour sessions of basic skills. Qualified nursing staff also have access to two one-hour basic training sessions, and additional training is provided for senior staff if they are required to use a computer in the workplace. The training takes place either in the school of nursing (theory) or in the local primary school (practical) that has a computer laboratory that all nursing and hospital staff can access after school hours for an hour. This is a standing arrangement between the hospital and school.

Informant 28

This meeting with Informant 28 (head tutor) was also particularly relevant to the topic areas of my research. IT training was discussed with Informant 28, and the provision of training in basic computer skills to various staff groups was confirmed and correlated with a prior conversation with Informant 7. In addition, CD-ROMs and USB sticks, with loaded content, were provided to nurses attending the CPD programme. Accessing the content is possible due to provision of basic IT training to those attending. However, as evident elsewhere in the research, not all staff had convenient access to a computer terminal or laptop to access the information, or had participated in training. Access to the internet and intranet is also variable. The content of each CD-ROM and USB stick consisted of research-based journal articles as part of the evidence-based practice module. Printing of the articles was organised by Informant 28, for those unable to print the material themselves, and

for teaching purposes to enable staff to have sight of the materials. The following table summarises the key points from two substantial informal conversations.

Table 5.5: Summary of conversations with informants, 2nd visit

Informant	Occupation/ role	Summary including folk and analytical terms
7	IT specialist	IT system, number of computers and laptops, bandwidth, server software, video conferencing, telemedicine internet access, subscription, private benefactor, IT training for nurses and hospital staff
28	Head tutor, SON	IT training for nurses in basic skills. CD-ROMs, USB sticks, research based journal articles and printing

Domain analysis from second visit

The following domains were developed from more focused observations and conversations with informants who were purposefully selected because of their expertise in areas of ICT systems development and training, and in nurse education. The information is divided up into the domains shown in Figure 5.5 with categories reflecting their semantic relationships.

The domains are all related to elements of the computer/ICT and education domains developed from the first visit. They were developed to reflect universal semantic relationships and informant-expressed relationships between categories; Table 5.6 summarises the types of semantic relationship identified by Spradley (1980). 'Computer/education and training' comprise types of nurse, and 'length of training and the CPD programme' are 'ways of doing' (means-end). 'Computer education/training locations' is a 'place for doing' (spatial). 'Computer provision' includes 'types of computer' (strict inclusion). The computer network is 'used for the internet provision' (function). IT developments 'are a result of ICT' (cause-effect), and IT is used in the CPD programme 'as a way of doing the programme' (means-end).

Figure 5.5: Domains and categories identified in 2nd visit

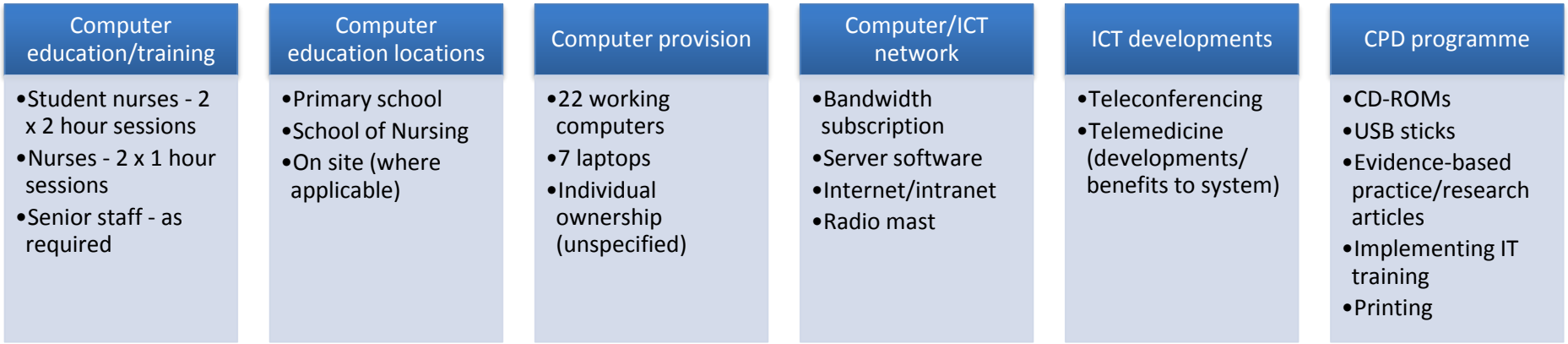


Table 5.6: Nine universal semantic relationships with domain examples (Spradley 1979; 1980 p.93)

	Universal semantic relationships	**Type of relationship**	**Domain examples (1st visit)**	**Domain examples (2nd visit)**
1	Strict inclusion	X is a kind of Y	Hospital staff, nursing practice	Computer provision
2	Spatial	X is a place in Y, X is part of Y		Computer training locations
3	Cause-effect	X is a result of Y, X is a cause of Y		ICT developments
4	Rationale	X is a reason for doing Y	Education	
5	Location for action	X is a place for doing Y	Computer/ICT, library	
6	Function	X is used for Y		Computer/ICT provision
7	Means-end	X is a way to do Y		Computer education/training CPD
8	Sequence	X is a step (or stage) in Y		
9	Attribution	X is an attribute (characteristic) of Y	Lifestyle	

Making a taxonomic analysis

A taxonomic analysis was undertaken of the domains from the first and second visits relating to computer technology, education and lifestyle, using a diagrammatic representation showing semantic relationships between the terms and further breakdown of the categories. The taxonomic analysis is a more in-depth examination of selected cultural domains undertaken as the research progressed. This also served to inform the development of interview and focus group questions in the third visit.

The internal structure of each domain is organised into a taxonomy which is a set of categories which relate more specifically to the domain. Each category was explored within the domain, and further subdivided with related terms to provide a more in-depth analysis. In addition, each domain may be part of a larger domain (Spradley, 1980) and this became apparent as the research unfolded, relating to both computers and education. An overall cover term of internet communication technology (ICT) is applied to include each smaller domain relating to computers for the purposes of the taxonomic analysis. Education also subsumed other domains including nursing practice, CPD programme, library facilities and computer training, thereby demonstrating how domains are categories in a larger domain. There are also examples of where some domains share categories, demonstrating overlap between domains; for instance, computer training for nurses can also be considered as part of education.

Table 5.7 contains domains that all relate to computers and ICT. This is an example of Spradley's (1980) suggestion that some domains could be part of a larger domain. Table 5.8 contains domains all related to education and Table 5.9 comprises the lifestyle domain.

Table 5.7: Taxonomic analysis: Computers/ICT

LARGER DOMAIN	DOMAIN Level 1	CATEGORY Level 2	SUB-CATEGORIES Level 3	SUBSET Level 4
Computers/ICT	**Computer education/training for nurses** (Means-end)	All nurses	Student nurses Nurses Senior nurses Tutors	2x2 hours sessions 2x1 hour sessions As required/regularly
	Computer education/training locations (Spatial)	Location	Primary school School of nursing In the workplace	Computer room In the library Offices/wards
	Computer/ICT provision (Networks)	IT infrastructure	Bandwidth subscription Server software Internet/intranet Upgrading systems Radio mast	
	Computer provision (Strict inclusion)	Number of computers in the hospital (2010)	22 working computers (Desktop) 7 laptops 2 individual ownership	Windows XP
	ICT developments (Cause-effect)	IT benefits	Teleconferencing Telemedicine	African partnership for patient safety (APPS) Treatments, diagnosis Education

Table 5.8: Taxonomic analysis: Education/Learning

LARGER DOMAIN	DOMAIN Level 1	CATEGORY Level 2	SUB-CATEGORIES Level 3	SUBSET Level 4
Education/Learning (all types of learning)	**CPD programme** (Means-end)	CD-ROMs/USB sticks Evidence-based practice/ implementing IT training	Research articles New knowledge and skills	
	Nurses' education/ learning (Rationale)	CPD Degree courses Online learning Library	Internet access	
	Library (Location for action)	Books Reading Learning Improving practice Computers	Limited range of books Out of date books New learning Internet access	
	Nursing practice (Strict inclusion)	Patient care Drug treatments Policies Use of mobile phones	Role of relatives HIV/prostitution Breast feeding policy	

Table 5.9: Taxonomic analysis: Lifestyle

DOMAIN Level 1	CATEGORY Level 2	SUB-CATEGORIES Level 3	SUBSET Level 4
Lifestyle (Attribution)	Chapel	Daily worship	Sermons Hymns/singing/drums
	Social activities	Dancing Music Watching football	Traditional (Jumping) Singing/drums Communal TV
	Eating/types of Food	Meat	Goat Chicken
		Fruit/vegetables	Passion fruit/pineapple Plantains/bananas Carrots/Potatoes 'Irish'
		Grains	Semolina Pasta (UK import)

Componential analysis

The third stage of analysis is componential analysis where similarities and differences are sought within the data. Individual responses to a set of questions or situations are compared, and cultural meanings and themes identified (Spradley, 1980). During the second visit, more focused observations were made based on questions raised from observations made in the first visit. It was becoming evident that divisions in understanding of computer technology and its implications for learning and social activities differed between and within professional groups. Componential analysis was at an early stage, but 'dimensions of contrast' were beginning to emerge in some areas of participant observation (McCurdy *et al*. 2005; Spradley, 1980).

Summary of participant observation and informal conversations

The first and second visits enabled observations to be made of the professional, social and cultural scenes at different stages of participation, along with documentation of informal conversations with several informants. By examining the notes in detail, key information was extracted including folk and analytical terms to construct domains and categories and make an initial domain, taxonomic and componential analysis. As a result, an interview and focus group strategy was developed, including questions designed to explore the utilisation of computer technology and how developments and access to technology were impacting on individual skills. Determination of the policy and cultural influences on the CPD of nurses and utilisation of computer technology are undertaken in the third and fourth visits.

April 2011 – The third visit

Introduction

The third visit included further participant observation and informal conversations to add to the data from previous visits. In addition, an ethics proposal was submitted prior to the visit which sought permission to undertake formal interviews and focus groups. This entailed formulating interview and focus group strategies and semi-structured questions with prompts informed through the domain and taxonomic analysis obtained from the first and second visits. Participant observation was ongoing throughout the field visit, and timings of interviews and focus groups were arranged for the convenience of the informants rather than the researcher, resulting in an integrated approach to data collection. In some research, focus groups are carried out prior to interviews to enable focus group data to inform interview questions. Alternatively, focus groups can take place following a set of interviews to allow further exploration of issues raised in more depth (O'Reilly, 2012).

Participant observation and informal conversations

One of the first activities on arrival at the hospital was a meeting with the senior management team, as in previous visits. This included the medical superintendent, hospital administrator, hospital chaplain and representatives from the UK university and hospital. This meeting was significant as my specific research proposal was discussed with the team and permission to conduct interviews and focus groups was confirmed. Prior to the visit, a copy of the research proposal was emailed to the medical superintendent (Informant 37) and the proposal was agreed with the research committee, who comprised the senior management team. In accordance with Uganda's guidelines for research (UNCST, 2007), each organisation should have a research committee which is designated by government to approve research proposals. Other matters discussed included outcomes data, and audit and clinical skills practice assessments which were part of the CPD programme. The chapel on the first morning offered a platform to discuss the nursing CPD programme for this visit, my PhD research, and the conduct of interviews and focus groups. Within the

hospital complex, the chapel is a focal point for communication and information exchange as well as daily worship, as previously indicated.

Informal conversations – summarised

Informant 7, a key informant from the IT department, was approached to arrange a formal interview later in the week. An informal conversation took place opportunistically about changes to the IT system. He also informed me about the major computer system upgrade in progress with a consultancy from Kampala who were on site for two months. These developments were unknown to the researcher prior to the visit, and provided an ideal opportunity to interview the external consultant to find out more about the systems and developments at the hospital. This enabled an initial approach to be made to the external IT consultant (Informant 23), due to his expertise, to arrange an interview. This constituted a snowball effect where the informant recommended another person to interview (O'Reilly, 2012). He advised that he and a colleague (Informant 32) were at the location implementing a new system to support management, pharmacy, outpatients and other departments. After the free programme trial, it would have to be funded directly by the hospital. The new system is separate from the present on site system and they would run side by side. This would result in a major shift in computer technology on site and have implications for training staff. He commented that:

> *…staff training… is an issue as some are very keen and capable of learning new skills. Others are very difficult to teach as there is a fear of new technology and they see it as magical….*

This is an interesting statement as Informant 28 referred to some staff, including nurses, who find it difficult to learn new knowledge and skills. This encounter provided me with an ideal opportunity to arrange a formal interview with the IT consultant to explore the local and national IT systems and networks, and implications for computer utilisation by staff, in more detail. The suggestion that new technology is 'magical' was also raised in an interview with Informant 17.

Informant 38, a senior nurse tutor, was approached to arrange a formal interview later that day. A brief explanation of the purpose of the interview was given, which would be expanded on when we met later. This prompted some unsolicited

remarks that were pertinent to my research about IT culture and computers, fear of the new, and change. Part of the fear was that the focus would move away from the hospital server after a new internet café had recently been established in the village. The following statement was noted:

> *…IT will divert people away from the church and they will spend time watching football matches….*

On the other hand, the internet café was viewed as:

> *…a welcome addition that offers wider opportunities for using the internet….*

In addition, the developments were also fuelling staff movement:

> *…up to 10 staff are leaving the hospital. Some are going to government funded hospitals and will be gaining a higher salary and pension.*

The implications of these comments are considered later in the analysis and discussion. By being raised informally, they could be followed through in more depth.

Informant 24, a nurse, approached me and wanted to share her experiences and level of computer skills knowledge. Some training had been undertaken as a nursing student and as a qualified nurse on the hospital site, but since the training there had been no opportunity to use the new skills. Although it is possible to access computers after work, it is not always convenient. Friends with computers could be asked, but she didn't want to bother them. She made a remark that was typical of other comments made by nurses in general conversation:

> *…we need a way to access computers on a regular basis to develop skills….*

A formal interview was arranged with Informant 17, but in addition he invited the team to a social gathering which involved firstly a lecture from a motivational speaker in the chapel, then a buffet at his house. This was part of a programme of professional development meetings for nurses. It was noted that the professional meeting was only attended by Ugandan staff. Again, this provided further insight into culture and lifestyle.

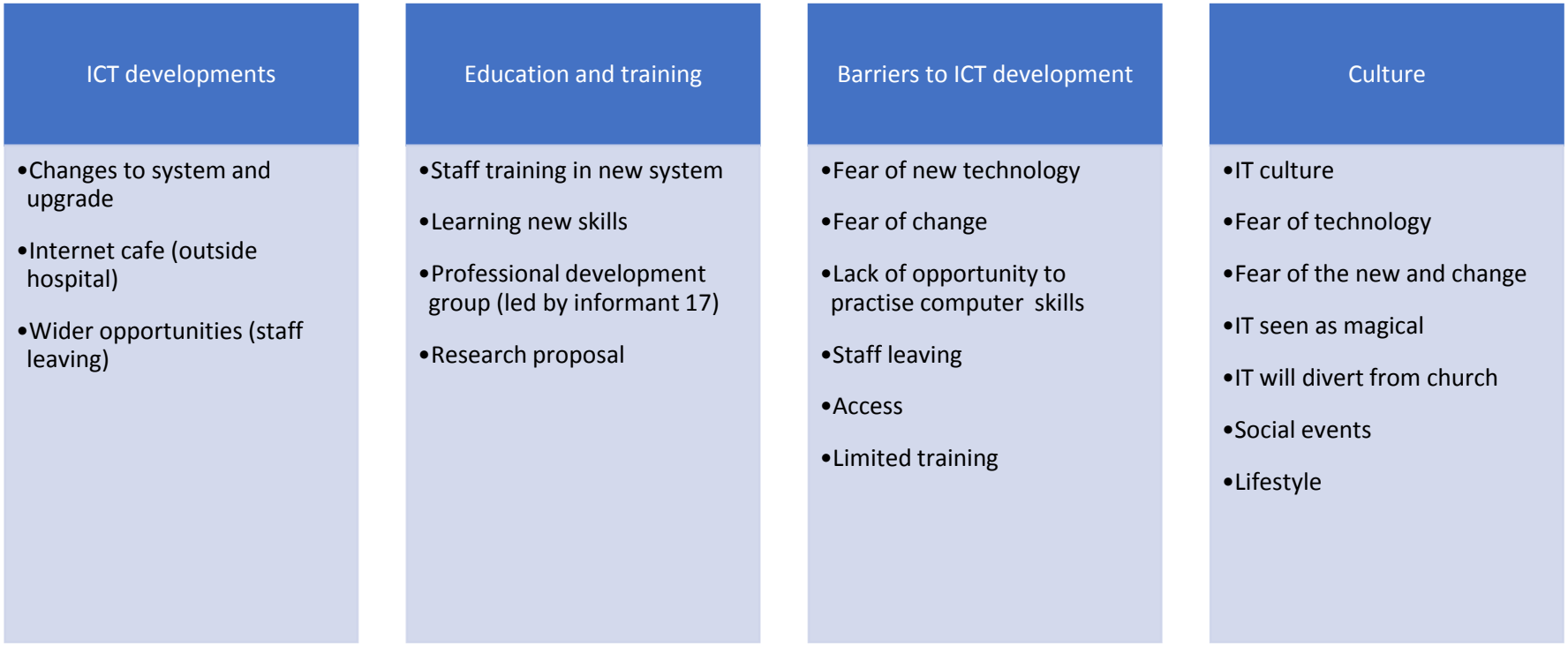
Summary

The information obtained in the third visit from informal conversations mainly focused on computer and skills developments and fear of how new technology may impact on the community. The informal conversations also served as a precursor to arranging formal interviews with the informants.

Table 5.10: Summary of informal conversations with informants, 3rd visit

Informant	Occupation/ Role	Summary including folk and analytical terms
7	IT specialist	**Planned changes** to the **IT system** and major **systems upgrade** in progress. IT consultant from Kampala – recommended to interview. Formal interview arranged.
10	Head nurse	Part of senior management team. Courteous, information about focus groups and interviews discussed and provided. Informant in focus group.
17	Senior nurse	**Social event** in chapel and home. **Professional development meetings** for nurses. **Cultural insight re lifestyle.** Formal interview arranged and part of focus group.
23	IT consultant	Implementing new **IT system**, providing **IT training** on site. Some staff keen and capable of learning **new skills**, others **fear new technology**, seen as **magical**. Formal interview arranged.
24	Nurse	Some **IT training** as student and qualified nurse, but **lack of opportunity** to practise **skills**. Need regular **access**.
27	Hospital administrator	Part of senior management team. Formal interview arranged.
32	IT assistant	Passive in conversation, but in agreement with Informant 23.
37	Medical director	**Research proposal** agreed with research committee. Conduct of **interviews and focus groups.** Formal interview arranged with MD.
38	Senior nurse tutor	**IT culture**, **fear of the new and change**. Fear focus will shift from **hospital server** to **internet café**, that **IT would divert people from church**. Wider opportunities – more **staff leaving**. Formal interview arranged and part of focus group.

Figure 5.6: Domain analysis of informal conversations, 3rd visit



Selection strategy for ethnographic interviews and focus groups

During this visit, individual interviews and focus groups were set up. Individual informants were purposefully approached for interview, based on knowledge from the first two visits and on who had contributed through informal conversations. Selection was influenced in favour of potential informants who were keen to engage in the research (Spradley, 1980); this included attendees of the CPD programme and members of the senior management team. Two focus groups were set up from attendees of the CPD programme only. Attendance at each focus group was optional, but most wanted to attend.

In this research, several of the informants who were identified during participant observation were asked to take part in individual interviews. Three of these were also undertaking undergraduate or postgraduate studies in addition to the CPD programme. These three nurses also held more senior roles in the organisation, and had already achieved post-qualifying nursing and academic qualifications.

Most of the informants who participated in formal interviews and focus groups were those involved in the CPD programme, and worked in different clinical or educational areas in the hospital e.g. senior nurse manager, ward sister or charge nurse, staff nurses, and tutors from the school of nursing. Other informants selected for interview to gain their perspectives were gatekeepers, including hospital senior managers, administrators and website technicians associated with the CPD programme and ICT.

Ethnographic interviews and focus groups

Five individual interviews and two focus groups were digitally recorded in April 2011, and subsequently transcribed verbatim between May and August 2011. An additional unrecorded interview was undertaken with expanded field notes made. A manual extraction of key themes from the data was carried out between September 2011 and March 2012. This was followed by a more comprehensive organisation of the data and identification of themes using MAXQDA, a computer software programme, prior to returning to the research site in December 2012 to undertake a second set of interviews and a focus group. Data analysis obtained

from participant observation, informal conversations, interviews and focus groups in the third visit contributed towards the interview and focus group strategy and questions asked in the fourth visit.

The focus groups and individual interviews were audio-digitally recorded and transcribed verbatim for analysis. Notes were also made following informal conversations to help increase cultural understanding of events and activities. Some formal interviews were not recorded at the request of the interviewees, and here contemporaneous notes were written to make a record of key points subject to consent given prior to the interviews. Other field notes were written contemporaneously as reflections or as observations of activity, interactions between people and to document significant events, to provide the basis of a rich description of life in the research setting. Reflections on these field notes were also written in a diary. It was evident during the visits, from the collection of data and personal observations, that culture and tradition played a large part in determining the way in which people conducted their lives.

Two focus groups were undertaken in the third visit, consisting of ten and twelve informants. One focus group was undertaken in the fourth visit with twelve informants, nine of whom were involved in the previous focus groups and three were new to the hospital but had joined the CPD programme in the second year.

It should be noted that several members of each focus group took part in individual interviews. In the same way, a number of those interviewed were not involved in focus groups. This is part of enabling informants to participate freely as individuals or in a group.

MAXQDA

MAXQDA was used to sort out the informant responses in each transcript into named subject sections or themes. This equated to Spradley's analytical domains or cover terms, folk terms and categories with associated information within each domain. The advantage of this process was that it provided an overall impression of the volume of responses to the questions asked. In future interviews and focus

groups, it was useful to see the changes in emphasis of the responses (see table below).

Table 5.11: Themes extracted from interviews using MAXQDA

Themes or domains	Grouping of categories	Aggregate number of responses
Computer systems and technical support	Computerisation, computer provision, communication, internet use, internet café, video conferencing	33
Barriers to ICT development	Fear of change Technical problems and IT support Funding and sustainability	29
Computer training, distance learning and education	Computer skills training	29
Culture and society	Change and fear of change	8
Policy	IT policy	2

The ethnographer can then analyse the data manually, aiming to identify patterns and meanings. In this research, the results using MAXQDA were further refined to correspond with Spradley's (1979) domains, folk terms and categories, which were extracted manually and synthesised using Microsoft Word (see table 5.3).

Interviews – Asking descriptive questions

The following questions are designed to elicit individual responses and were applicable whether the informant was a member of the nursing or clinical staff, an administrator or a member of the senior management team. The questions are developed from previous field visits and resulting domain analysis from participant observation and informal conversations, and aim to explore computer training and experience, what is known about the ICT infrastructure, development plans and barriers to further development. The questions are semi-structured, allowing for spontaneous development of the interview and for views to be expressed on the current provision and development opportunities for internet technology. To ensure consistency, the individual interview questions are asked in the same order as far as possible and informants given time to answer fully. This is done to avoid influencing their responses, and to ensure that their responses are derived from

their own knowledge or experience (Spradley, 1979). However, further questions are asked in some interviews to allow areas relevant to the research, raised by informants, to be explored in more depth. Additional prompts are used occasionally during the interviews, especially at the beginning of each interview to stimulate initial responses. Each interview is critically analysed, and comparisons made between informants and their responses. Spradley (1979) advises to analyse each interview before proceeding to the next. It was not possible to do this in depth between interviews due to time constraints in the field, but analysis took place of the first six interviews following the third field visit, along with analysis of participant observation and conversations; this then informed the second set of interviews, focus group questions and areas for further exploration in the fourth field visit.

The questions asked are shown in Table 5.12, although as indicated the order and structure of each question is adapted to each interview situation to allow for flexibility and spontaneity of the exchange.

Table 5.12: Individual interview questions

1	What **experience** have you had of using computers and the internet?
2	Can you tell me about any **specific training** you have had using computers and the internet?
3	What sort of **IT training** do you think you need to help **develop your skills** further?
4	What internet and computer technology **infrastructure** is currently in place?
5	What **development plans** does the hospital have?
6	What may be **preventing or helping** further ICT (or skills) development? (**Barriers and facilitators including cultural aspects**)

Individual interviews

Interviews were conducted at a mutually convenient time with each of the six informants (see Table 5.13). The interviews were undertaken at the informant's place of work in offices, wards or classrooms. The purpose of the interview was explained and that it would be recorded with their permission. One informant preferred the interview not to be recorded. A consent form incorporating a

summary sheet explaining the purpose was provided, and each informant agreed to be interviewed and signed the consent form (see Appendix 1).

Table 5.13: Duration of each interview

Informant	Occupation	Duration/minutes
7	IT	30 approx. (Unrecorded)
17	Nurse	25
23	IT	45
27	Administrator	25
37	Medical director	30
38	Tutor	25

Domain analysis and synthesis of interviews

In common with analysis of participant observation, identifying folk terms and semantic relationships are stages in an analytical process to identify domains and categories from individual interviews (Spradley, 1979). A table summarises domains and folk terms elicited from interviews and informal conversations. A summary of each interview is made including an individual domain analysis, followed by a synthesis of all six individual interviews incorporating the informal conversations. The synthesised analysis from this data incorporates domain and taxonomic analysis which is expressed in themes resulting from identified domains and categories. A componential analysis is undertaken at the end of the third and fourth visits, after the interview and focus group data has been collected and additional participant observations and informal conversations undertaken.

Domain, taxonomic and componential analysis of the interviews and participant observation data from the third visit

The domains, categories and folk terms elicited from individual formal interviews and informal conversations from the third visit are integrated under six domain headings, and correspond to the themes used for analysis and those extracted using MAXQDA. The rationale for integrating this data is that six of the interview informants also contributed through informal conversations (Informants 7, 17, 23, 27, 37 and 38) with some overlap of the data. Three informants (10, 24 and 32)

contributed through participant observation only and have been incorporated where relevant to the analysis. This information is integrated into the following table which summarises the domain and taxonomic analysis of the data, and provides a framework for synthesis of the data. Previous participant observation data from the first and second visits are referred to where relevant to the analysis.

Table 5.14: Domain and taxonomic analysis of 1st set of interviews and informal conversations, 3rd visit

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
Computers & ICT developments	Computer provision	10 laptops & 17 new terminals	Increased ownership & access	Cause-effect X is a result of Y	7, 17, 23, 27, 37, 38
	Infrastructure	New system upgrade	Improved signal, Internet speed		23
	Improved communication	Telephone system, Emails	Video conferencing Internet café Data sources		
Barriers to ICT development	Technical support and training	Support for staff Access issues Lack of opportunity to use skills	Staff leaving Too few computers Staff with little or no skills	Cause-effect X is a result of Y	7, 17, 23, 27, 37, 38 24
	Infrastructure	Internet speed slow Connectivity	Slow download Signal interference (rainy season)		
	Sustainability	Power/electricity	Bad weather		
	Cost	Benefactor/sponsor	Expense to individuals e.g. modems		
	Social barriers	Disadvantageous to society Resistance Fear of change and technology	Some opposed to social media Wasting time, money		
CPD/ education/ training	Distance learning	Online courses across Africa Research skills	Work and study at same time Live teaching using internet	Rationale X is a reason for doing Y	7, 17, 23, 27, 37, 38 24

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
	Library services	Personal development group	Increased opportunities		
	Computer skills	Accessing information			
Learning theories	Activity theory Experiential learning Self-discovery/ exposure	Learning by doing Learning by trial and error Observation		Strict inclusion X is a kind of Y	17, 38
Culture	IT culture	New information on current affairs Global perspectives	Supporting people in new ways	Attribution X is an attribute (or characteristic) of Y	17, 23, 27, 37, 38
	Service culture	Influences attitude and thinking Fear of technology Fear of the system (new system)	Non-acceptance, lack of understanding Loss of jobs		
	Reading culture	Old culture is writing and recording in books Adapting to new ways of learning	Online reading rather than books		
	Local culture	Advantages & disadvantages to society Fear of change and technology Impact on community Social impact	Computers seen as magical Management blessing the technology Buying versus giving Lifestyle		
Policy	IT policy	Country and organisation	Obsolescence & disposal	Rationale X is a reason for doing Y	27, 37
	Research policy	Research proposal			

Synthesis of interview and informal conversation data

Computers and ICT developments

Computer and information communication technology generated a large amount of data from the first set of interviews, and each informant provided valuable contributions to knowledge and information about computer provision, infrastructure, communication, new developments and some of the benefits these bring.

Update on developments and computer provision

The first conversation and interview with Informant 7 provided an update on current computer provision, the recent purchase of new computers and development plans. There had also been an expansion in the number of computer terminals and laptops in the local primary school and hospital, demonstrating gradual expansion of equipment. This expansion also increased opportunities for nursing staff to access computers and the internet for educative and social purposes at various locations on site. He made an important remark about the future of the system linking to education:

> *…the computer system depends on management to continue and there was no conclusion yet as all depends on the price. The server can also now be accessed remotely, and the new system has potential for live teaching by using a laptop and projector….* (Informant 7)

He also discussed the work of the visiting consultant IT specialists from Kampala who were developing a new system to run alongside the existing one. The developments in ICT had accelerated since my last visit in February 2010, and further information was sought from Informant 23 (IT Specialist) about the future potential of the computer system at the hospital. A needs assessment was carried out to identify the problems and how these could be addressed to improve efficiency of outpatient services, pharmacy and stores. The plan was:

> *…to integrate those institutions to be able to make them function in a way that management could have control and so that staff could use those systems in their daily work… the one advantage we have is that there is internet here and wireless already…*

> *…eventually we have come down to the tasks… first requirement is a tool to work in pharmacy to help with dispensing and maintaining the drug flow… then a system in stores to implement a procurement and purchase system… after that the patient record system…* (Informant 23)

The IT consultant then discussed how he was going to streamline the patient record system by making it flow better. This would involve cutting down on the use of paper record books by using the electronic system to store patient demographic data. Each patient (after the initial visit) would be issued with an identification number to reduce future queuing and stages in the outpatient's process. He concluded by saying that:

> *…By integrating these departments, we are enabling them to be more efficient and enabling the hospital to serve their patients better and also enabling then to know their patients, they don't know their patients properly…* (Informant 23)

The factual account of computer provision and developments also concurred with interview data obtained from Informant 27, who confirmed the expansion of computer equipment and that current developments would take about two years to complete.

Sustainability, funding and telephone communications

Informant 27 also commented further on funding to sustain the computer system and telephone communications:

> *…currently we have a partner who is funding us with the internet, whether he is committed to continue for long we don't know… also management has looked at with or without outside funding we must put in our budgets some money to commit to IT… even employing another person… We have the basic computers mainly for communication in use… this is the big thing… now we have visiting consultants who are helping us put in place a system that can improve even the telephone systems within the hospital and help us in data keeping and be able to trace for example even the drugs and computerisation and all the services, that's where we are now basically…* (Informant 27)

I asked him if he thought the use of telephones (as opposed to mobile phones) had declined due to the internet. Informant 27 then described two examples of how using emails and the internet were transforming working practices, whilst acknowledging the cultural impact and clinical benefits:

…I used to pay a lot of money for the post to come from the post office (in the nearest large town), now everybody seems to be emailing and so… (he laughs) … they say we are becoming like 'in the West', in the next door I am emailing you, and in our culture, this is considered to be rude because why don't you walk into my room?

Secondly… a doctor may look at materials on the internet, even when seeing patients… so it has become like a source of material… for managing patients… (Informant 27)

Informant 38 also commented on plans at the hospital to develop mobile telephone networks (MTN) which would also improve the internet capacity and hoped that:

…the management buy the idea… so they need to keep subscribing… to get full access. (Informant 38)

Further comments about ICT were made by Informant 27 about developments in videoconferencing:

…I know Dr… attended a conference in West Africa but to me that sounds too big for us at this stage although we have heard some stakeholders who are interested in introducing here… it's a good idea but we would want to go slowly and see how we develop.

And of course, when there are people like you coming over who can share their experiences, some things must have gone through a process, so we don't simply want to jump where we are when we haven't gone through… for the sake of learning.

I remember one chap who was here, he was mentioning that… he was given funding and he wanted to start a telecentre and do video conferencing and I say 'Look we are in a village where a woman or man cannot even write their name and you are expecting them to use the internet' and the chap wasn't happy with me… (Informant 27)

The comments made are acknowledging that changes are occurring, but there is some concern about the pace of change and the impact on the culture of communication.

Internet café

Informant 27 also informed me about the internet café that had recently been established in the village and commented:

…surprisingly the other day I was walking down the road, there is an internet café now starting… just over the bridge… but of course we have constant

power and other places in Uganda don't have adequate supply therefore they cannot really run the internet service… so of course this (electricity) is quite key… At the internet café they come from the villages to send messages --- and 'he' is also doing some initial training and they have a facility for typing, typewriter and photocopying… (Informant 27)

This remark reinforced the advantages that the local area has in generating its own electricity and power supply, which attracts businesses to come to the area. The internet café is also providing a service to the local population as well as an option for hospital staff. My attention was also drawn to comments made by Informant 38, during an informal conversation, that the internet café was viewed positively by some as offering wider opportunities for using the internet; but others were concerned that IT, partly in relation to the internet café, would divert people away from the church. The comments demonstrate a contrasting view of the benefits and disadvantages that greater access to the internet through the internet café may bring.

The formal interviews and informal conversations in the third visit have provided clear examples of ICT developments at the hospital, including development and expansion of the networked system, additional equipment including laptops and computers in various parts of the hospital, improvements in the telephone system and teleconferencing, and access to an internet café at the edge of the village. All this would not be possible without a reliable and managed power source which supplies the hospital community and village, enabling further expansion and potential. The final comments from Informant 27 provide a positive outlook for the future of ICT development and the value of shared experiences, but caution about the speed of development and that some people were ill-prepared was also voiced:

…As we build this system we must be aware that we have the means to keep it running because sometimes people come, and you get excited about proposals… you are going to, then it is lost… So, this is why we are quite careful that we start slowly and see where we are going because when we look at things now it is expanding, a lot of things are coming in, so I don't get excited so much about expansion, I want to be sure that I have this small thing, but can I maintain it, and can I sustain it… (Informant 27)

Barriers to ICT development

There are many barriers that influence and interfere with the development of ICT. Despite the developments in ICT in the research location from strategic and organisational perspectives, many of the barriers are due to technical problems, some of which are outside the locus of control, but gradually being addressed. From an individual perspective, the restrictions experienced are partly due to technical issues, personal skills development, access to computers and social barriers. This led to some differences in responses from informants, providing areas of contrast in componential analysis (Spradley, 1979). The barriers are analysed under the categories of infrastructure, sustainability and cost. Training and social barriers are considered in the education and culture themes.

Informant 38 commented on several barriers to development which include too few computers available, the 'not so strong' internet and bad weather affecting reliability of the internet. These *"limit skills developments*" due to issues with access. However, Informant 38 has his own modem and laptop and can usually access information quickly, but cost was a prohibitive factor. It was not always possible to pay a subscription regularly, so access was intermittent:

> *…so, if I am doing a lot of work and download a lot of information, I need to pay around 70000ug to be able to access that internet. But it is quick and as long as I have subscribed to it, I easily access information…* (Informant 38)

Informant 37 also confirmed that there can be interference with the internet signal, especially in the rainy season, and some people were buying small modems:

> *…at a point when our internet was having interference, especially at the peak of the rainy season, we noticed that some people were buying small modems… they could always launch air time on them so there are some positive trends. Now that internet services in terms of broadband and micro systems is getting cheaper, because of competition, I see much more usage and increased access…* (Informant 37)

Informant 17 also had a modem, but was advised by the IT consultant that a modem was now unnecessary as the signal had been boosted. These comments illustrate some differences in understanding of the new network system. The main internet system is also dependent on a subscription to maintain it.

Informant 37 talked about the wide range of experience, abilities and attitudes towards ICT that can influence the learning and development of staff:

> *…we have a big population of staff that is timid or naïve with computers and instead of getting excited some of them get worried, but at the same time there is another group that is really keen… whatever opportunity they are given they want to utilise it… because it is a new thing… it is not always realised that they are weak in this area…* (Informant 37)

I also asked about accessibility potential for computers and a small access point for staff in the hospital, as suggested by staff, now that staff are developing their skills:

> *…yes, I think significantly now bigger potential than two years ago… if someone reasonably skilled can use the computer they have much more opportunities now to utilise computers. For example any staff can walk to primary school, if they have time booked there, to use the computer to learn how to use Excel, Word etc.… unlike in the past it wasn't possible… we have now reached a point whereby people no longer want to go looking for computers elsewhere, they now feel it is time for people to have their own computers – so we have now reached that level where even people who are in positions of responsibility feel they should have computers instead of going to a general place…* (Informant 38)

These remarks signified a change in the opportunities available to staff.

Informant 7 discussed the system and although the internet speed had increased, difficulties are still being experienced with downloading documents and opening emails. Informant 24 also talked about computer training, but had limited access to computers, preventing her from developing her skills further.

In summary, some of the technical issues experienced are gradually being addressed through development of the system, but physical access to computers was still limited although there is an increase in equipment. More staff are wanting access to computers, but cost is a controlling factor, both to the hospital and to individuals. The hospital subscription is partially dependent on a third party, and modems are individually financed.

Education/CPD/computer training

All the informants interviewed had well developed computer skills. Some informants described their training experiences and ideas for skills development,

while others shared their knowledge and opinion on the benefits and future of distance learning.

Computer and staff training

Informant 38 described that he had initial computer training in another hospital, but that was limited:

> *I had training in using the computers when I was training to be a nurse tutor about three years ago, but this was limited… there were only four computers available and not much opportunity to practise… we were forced to use internet cafes and pay money for people to help us surf information for our studies.*
>
> *…when I finished my training, I did not get enough access to computers until last year when I got a laptop provided for my degree studies from the… university, that's when I started to use computers more frequently. There is very limited access to the internet here (at the hospital) and I was forced to buy a modem which I am now using for my e-learning so I am gaining more experience.* (Informant 38)

He had not personally received any further training in his current role at the hospital, but will phone the IT specialist for assistance. He described that the IT specialist provides computer theory and practice training for nursing students in the first year and for general staff, but explained that this could be developed further:

> *…If we could have a formal kind of programme… training through all the computer packages especially on my side (SON) to do with PowerPoint, Excel... and then go on to internet – more and more detail – because I don't have more detailed knowledge of using internet – I think that would be helpful.* (Informant 38)

However, when Informant 38 came to the UK he received further training on searching the internet and how to use it for e-learning:

> *…I think I found it more helpful because I would use the information I was given to navigate through and search for information… to me it was accessibility of computers and the sessions I had were very, very helpful… I am able to access the modules on the university website and be able to do my studies, it is becoming easier, the more I use it the more I get, learning more how to use it …* (Informant 38)

Informant 17 was taught basic functions of the computer and Microsoft Office:

> *I just went to the teaching area when they introduced us to how we use the computer, each part, its functionality and other things I taught myself… I am planning to discover (the software packages) myself… if I don't understand I can ask the technician and they can take me through the support they have… they are experienced and knowledgeable.* (Informant 17)

Informant 17 had also been to the UK and I asked him about further training he had received as part of his degree in the UK:

> *…yes, I can access all of the information… but keep to discovery methods. When we went to the library, they briefed us on information services and library services. I understand how to use the websites and words needed…* (Informant 17)

Staff computer training was also addressed by Informant 27 who explained how nurses can use the skills on the wards in the future:

> *…the primary school has a few computers that came in from the nations and we are giving basic computer skills to the pupils in primary school, and also the nursing school… we also have a programme for all the staff to be trained in computing… for example we are hoping that in the future the manual work will be less and therefore even the nurse on the ward should be able to enter data on to the computer so that they need that basic skill...* (Informant 27)

Informant 38 was also asked about how he thought staff were responding to the new technology:

> *…some are actually into it, they are looking forward to it, but others are like... because someone I was talking to... she said... "At my age can I manage to use a computer?", especially more old people in the team, but others are looking forward to it and eagerly waiting to gain more skill and use it more…* (Informant 38)

This final comment indicates the different stages people are at in their positive and negative attitudes towards new technology and being able to learn new skills. Age and capability are being raised by a member of staff who queries if it is a relevant factor.

Distance learning

Informant 27 also spontaneously raised online learning as a future development locally and throughout Uganda:

> *…I am aware now that staff is taking studies online… if they start the diploma course in the nursing school, online training is going to develop because local universities in this country have started distance learning and encourage online teaching… I have seen recently some universities encouraging Africans in online, kind of…. and so, in the near future it will be very different and popular I think, and increasingly because of the many new service providers in the country, it is becoming cheaper to have the internet but, in the past, it was quite expensive so much we could not afford…* (Informant 27)

I followed through on some of the issues raised by Informant 27 with Informant 37 concerning the impact of computers and the internet on the knowledge development of nurses. Informant 37 was interviewed after Informant 27, so I was able to explore some of his comments, partly as a means of ongoing and opportune respondent validation:

> *…I am seeing a change in attitude and thinking in line with education because one of the biggest problems we have is financing for education… someone leaving their work and getting a scholarship and going away to study… so because of that… the trend now is people doing their work while studying at the same time…* (Informant 37)

> *…what is happening here is that distance learning becomes much busier, much faster with the improvement in ICT. I look at myself as one of those examples… I don't think I would have studied if there was not that kind of time. Many more people are getting on board… one of the biggest problems in the past was getting a degree… when for example the base line was done (scoping visits for the CPD programme in 2008), the perception was that we don't need degree holders, but now with ICT coming in people now realise that actually we need degree holders. Because of job security, because of the level of staffing, ICT gives a bigger opportunity for our people to study so they don't go away and come back, they can spend much more time here… send reports and send assignments… they are still working so they are benefiting themselves and the same time benefiting the hospital, and so when I look at the impact of ICT involvement I think that is the core and you can start seeing it happening and increasingly everyone realising that you can't say that we don't need degree nurses because the potential has been shown that people need to upgrade. When someone has a degree. Why? They are ready to do research, that somebody with a certificate may not have, and what is the importance of research in terms of helping the hospital? So, these are the thing that are coming, they are very positive.* (Informant 37)

We went on to talk about three members of staff who are stepping up to that level:

> *…they will start to think and search for information and start to self-learn… they are that example of being able to learn at a distance and still in the workplace – and study for their degree, so it is showing that it is possible and an alternative way of studying…* (Informant 37)

The interviews with informants 27 and 37 reveal details on computer training, skills development and distance learning, and are very positive. They provide an insight into the developments occurring in the hospital, and the value placed on new ways of studying and working through development of distance learning. The cost of such developments is acknowledged, and that some costs are becoming cheaper.

Learning theories

This theme was distinctive because two informants specifically discussed learning theories in relation to learning, giving examples from their own experiences and from observations on their colleagues. These included activity theory, experiential learning and discovery methods of learning.

Activity theory.

Informant 38 illustrated what he meant by activity theory by referring to the professional group of nurses undertaking the CPD programme. He remarked:

> *…the group is enthusiastic about the whole programme and the training and they are more interested in searching for information and using EBP – they heard about it and want to push it forward – the challenge they have as said before they have no skills in using computers, some of them, others have a few skills and they are not so efficient at using computers…. To get a computer is so handy for most nurses and if there was more accessibility to computers and they got training, that would be very helpful, and it would work better…* (Informant 38)

These comments also link with previous remarks from informants about variable computer skills and access to computers to practise the skills. Informant 38 discussed the benefits of the new technology in searching for research articles and applying to practice:

> *…when we were doing the research critique of the articles… they (CPD attendees) wanted to search for more articles… and they practised critiquing them which to me was positive…*

…personally when I go through an article using a format, for example Benton and Cormack framework, I get to know it, it becomes easier to read, sometimes reading an article is very boring but if it is in a framework it guides me to read every part of it and its application is that I am able to find out if the evidence I have seen, whether it is applicable to my practice so this makes me find out what is applicable and which evidence can I use to change practice…

…in my role as a tutor, if I search for information, I am able to give up-to-date information… (Informant 38)

The three previous remarks illustrate activity theory, and that learning is taking place through doing and practising new skills including searching the internet for research articles, developing critiquing skills, applying to practice, changing practice and finally disseminating up-to-date information to student nurses. In these situations, the learning objectives are achieved through goal orientated activities (Arnseth, 2008).

Experiential learning

Informant 17 also talked about discovery methods of learning or learning through experience during the interview. After being taught basic functionality of the computer in the teaching area, he prefers to discover by himself how to use software packages, spending time doing scholarly activities online, and browsing current affairs and news on the internet.

Culture

Cultural issues were raised frequently during interviews and informal conversations with informants. This provided an opportunity to ask informants to provide further details on points made about culture. These are categorised into IT culture, service culture, local culture and reading culture. Each of these categories was subdivided through taxonomic analysis to form the content of this theme, and included further topics such as fear of technology and change.

IT culture

Many comments relating to IT culture concerned the fear of technology, fear of change and resistance to change. Informant 27 expressed several factors concerning change and bringing in technology:

*…There are people who have **fears about technology**…For example I am in accounting and I am used to money systems, I know you are talking of this... there is **a fear to change**… this is why we are going slowly.*

*The 'old sensitised people' say that where we are going is a good thing to do… but we are also aware that people **resisted** for some time because (1) they don't have the skills and (2) we are going into the unknown. This is how we have been living.*

*I have had people commenting this is **too much speed**, what if it crashes? That kind of thing, and so yes, we are finding the **fear for change** is a factor and also the willingness for people to... for example, learn the basics of how to use a computer… and of course my personal comment would be "**Can we sustain it**?" As we build this system, we must be aware that we have the means to keep it running because sometimes people come, and you get excited about proposals… you are going to, then it is lost.*

*Yeah... One thing for definite is the funding that is a quite clear factor. With money we will be able to do that. Also, the willingness of management to **bless this technology**…* (Informant 27).

A further aspect to the IT culture is computer ownership. Very few people own a computer, but there are signs of that changing, demonstrating a cultural shift. Informant 37 gave an example of staff owning computers:

…it is happening in individual cases… a staff member came to me about two months before… he wanted me to buy him a computer in Kampala… I said, "Why don't you go and buy it yourself?"… he said "Look, Doctor… I don't know what computer is good…", he wanted something that would do the work for him… I said keep the money till you go to England and buy something there… such initiative from staff, buying their own computers is unheard of because the culture here is that people always expect the hospital to give them… (Informant 37)

I wanted to explore this in more detail so asked how culture influenced this process:

…we are beginning to see a cultural change in one way… when people now are believing that the hospital cannot give them everything… they have to begin buying some of these things, especially they feel they are going to benefit from their usage… so that is very positive… (Informant 37)

Several comments were made to me about computers wasting people's time. Informant 17 said that he had been challenged about spending too much time and wasting time on the computer:

> *…I don't think the internet wastes much of my time, it helps me to organise my time, I have no time to waste… I have no time to watch movies or films and I spent much of my time doing scholarly things. Another bad thing with internet, many people instead of going and doing what they need to read or access, they can waste time on social networks, Facebook and chatting online and they can go into pornographic sites… wasting time and getting addicted to the internet…* (Informant 17)

The issues raised by Informant 17 had also been raised by others.

Service culture

Informant 23 was very specific about the service culture that existed in the hospital setting, as it was impacting on introduction of the new IT system. He described the existing manual system as complicated and added that:

> *…the electronic system is still complicated due to the environment and **the culture of the service delivery**… it has been calculated they have to pay for each service before accessing it and you can see the fears, even then people will not pay if you give them all the services they will just walk away and not pay…* (Informant 23)

I asked about the change in service culture and how this is affecting everyone:

> *…**Another culture** is writing names in books… this is creating chaos, duplication of tasks, need to put them aside….*
>
> *…You can see as we sit here two personnel have come in and they both need technical support. About 22% of the people are on board with the changes… we have a lot of skilled people but no one to take an interest – we need to get another approach. There are **fears** about people getting 'fired' if they do not comply. Another setback is that some people we trained are leaving… so that has given us a setback…*
>
> *…people need to take responsibility. Some people need to step up, they are appointed but don't know what to do and this is a failure in the system… people at the top need to look into the system, then they will realise that the IT system is working…* (Informant 23)

The introduction of the new IT system clearly clashed with the existing manual service culture at many stages in the process between a patient arriving at the hospital and leaving or being discharged. This is further complicated by the payment systems in place.

Local culture

Locally, the introduction of computer technology was a relatively new phenomenon. A suite of computers was installed at the local primary school, and a few in the school of nursing and on the hospital site. The senior management team at the hospital has access to their own computers in the workplace and often in their own homes. Beyond that, only two other staff had laptops on loan at this time.

Informant 17 was asked what he thought are the advantages and disadvantages to society of using the internet. Informant 17 talked about his own experiences of using the internet, studying online and browsing current affairs in the news:

> *…if you are a person serving the community enquiring different sources of data, then help them to get benefits, help people with problems. With research… many people come to consult me for assistance and it becomes a challenge…* (Informant 17)

He saw the advantages of using the internet to help others. Because he was prominent in the community, Informant 17 was known for his thirst for knowledge and his computer skills. I asked him further about why some people find new technology frightening and don't understand the benefits:

> *…they don't understand what it can do, the management, some of them before approving the internet system have a negative attitude not realising the significance. They don't remember you can access the news instead of buying a newspaper, because people are not understanding it and range of internet services, they… do not see the importance of making links and have no ideas of global perspective…* (Informant 17)

Finally, Informant 17 made additional comments that were significant in understanding the culture surrounding the introduction of computers and internet technology when local people or patients see a laptop for the first time:

> *…when using the laptop in the ward, nurses were walking around to the back of the screen to see what was there, not understanding the way it is a receiver and electronic rather than magic…* (Informant 17)

The comments indicated that even some of the nurses had no knowledge or experience of using computers.

Reading culture

Reading culture was raised spontaneously by Informant 38 who saw it as being revisited with the introduction of computer technology. It was forcing people to read online as part of their education, as well as from books:

> *…this training has made us learn that it is very important to do some reading as we work, but the reading culture is that after school you have finished with books, but now because of this programme and because of this CPD training I think it has woken up people. People are now getting interested in the culture of reading…* (Informant 38)

The introduction of ICT has important implications for Ugandan culture. This point was made very clearly in research undertaken by Yagos *et al.* (2017, p.4) who "strongly believes that ICT will improve reading culture for health workers… which will improve the quality of health services".

Policy

Informant 27 was concerned that there are no policies in place to guide or control the development of IT, its usage, and the disposal of outdated or broken machines:

> *…Even as a country I don't think we have a policy on IT and so the institution wants to see that developed to guide us, to help us… An example is getting things from the west – some of the computers are just useless and so if the government has a system of checking that, which I think will be in place very soon, so that just giving out from England can be used in a proper way and also so that people do not misuse what we have got and also and how to dispose of these machines… all those will need a policy to guide us so that we don't end up in a mess....* (Informant 27)

At the end of the interview, Informant 37's final remarks were:

> *…I am an optimist and always believe that change can happen… it can take many years and looking back I can see how far things have come… when you work here every day it does not look like anything is happening, but when you get out and reflect backwards you can really see. It is the important thing, this documentation, you come and document… then you can see… six months, one year and yes this has happened…* (Informant 37)

Ethnographic focus groups

Focus groups were undertaken, firstly to explore themes emerging from participant observation and secondly to complement individual interviews. This method of

qualitative research enabled me to interview a group of informants together, to explore and collect information via a collective response, and to encourage debate.

In this research, the length of time available for data collection was constrained by the length of the field trip. Focus groups seemed to be the ideal way to generate a quantity of data in a short period of time from a relatively large number of informants. This allowed the remaining limited time to be available to interview key informants (Schensul *et al.,* 1999). Schensul *et al*. (1999) also emphasised further advantages to conducting ethnographic focus groups: they enable the researcher to analyse group members' reactions to each other and resulting insights, including agreements and contrary views. In addition, by facilitating debate prompted by open ended questions, focus groups allow for "natural language discourse" (Schensul *et al.,* p.52) and articulation of descriptive terms representative of the culture. This corresponds with Spradley's (1979, 1980) elicitation of folk terms leading to the construction of domains and categories.

Locating and inviting informants to take part in the focus groups

Each focus group was drawn from those participating in the CPD programme and comprised senior nurses and school of nursing tutors. The informants were already divided into two groups and taught on separate days for logistical purposes. Focus group 1 was carried out in the first week and focus group 2 in the second week of the programme. To ensure consistency between each focus group, an introduction was given explaining the purpose of the research and the focus group approach, and a supporting information sheet was distributed to each member of the group. Each person completed a consent form and given the opportunity to opt out of the group should they wish (see Appendix 1). The focus groups were undertaken at the end of the teaching day. Informants who wished to participate were asked to stay behind; not everyone did, due to other commitments. Each informant was given a number for anonymity. The number corresponds to individuals; some had been interviewed individually and others had contributed via informal conversations during the first two visits. The focus groups were initially reported separately and analysed together to compare common themes. MAXQDA was used to organise the

responses into common themes. Focus group 1 comprised ten informants and focus group 2, twelve Informants (see Table 5.2).

Table 5.15: Focus group 1 and 2 informants

Focus group 1 – 04/04/11	Duration	Focus Group 2 – 11/04/11	Duration
10 informants: 8, 9, 16, 17, 18, 19, 21, 25, 30, 38	35 minutes	12 informants: 1, 2, 4, 6, 10, 11, 15, 26, 31, 33, 34, 35	35 minutes

The following questions were used as prompts to engage the informants in discussing their experiences.

Table 5.16: Focus group questions

1	What **experience** you have had of using computers and the internet?
2	Can you tell me about any specific **training** you have had?
3	Are there any **barriers** that may prevent expansion of progress? (such as culture)
4	Can you suggest ideas for further development?

Conduct of the focus group

Questions were asked in order and informants encouraged to engage in discussion within the groups, to a point where the question had been answered and discussed as far as possible before going on to the next question. The questions are similar to the individual interview questions to allow for data to be captured on greater numbers of informants, and to generate discussion in the group between informants. From the questions, themes emerged which are summarised in Table 5.17.

Some comparisons between the two focus groups

There were ten informants in focus group 1, all of whom contributed to the discussion. Two members (17 and 38) of the focus group were also interviewed individually during the same week. In focus group 2, out of twelve informants, four informants did not contribute and remained silent. Informant 10, who was head nurse at the hospital, arrived ten minutes late; she did contribute some very

valuable information and stimulated discussion. However, her position of seniority and power may have inhibited interaction between some of the informants (Spradley, 1979). Of focus group 2, only informant 10 took part in an informal conversation during participant observation. Informants 2, 26 and 31 were interviewed in the fourth visit.

Initial responses to the focus group questions from both focus groups are aggregated into themes corresponding to Spradley's domains and categories, as indicated in the table:

Table 5.17: Themes extracted from focus groups using MAXQDA

Themes or domains	Grouping of categories	Aggregate number of responses
Computer access and utilisation	Experience – limitations and access Computer ownership Mobile phone use and alternative technologies	32
Barriers to development	Lack of confidence Difficulties in learning new skills Fear of computers Wasting time Funding	6
Education	Computers in education Training Exposure (learning theory) and experience (ranged from nil to fairly well developed)	19

Computer access and developments was the predominant theme, followed by education and barriers to development.

Emerging themes

Themes emerging from the focus group analysis were similar to the interviews and informal conversations that took place in the third visit, except for culture and policy. Three presenting themes emerged from the two focus groups, and were refined and presented as domains and categories in a taxonomic analysis (see Table 5.18). These are computers and ICT developments; barriers to ICT development; and education and training.

Table 5.18: Summary of FG 1 & 2 responses grouped in domains or themes and categories

Theme/ domain	Categories	Sub-categories	MAXQDA aggregate responses	Focus group 1 or 2	Informant
Computers and ICT development	Experience	Variable experience Never used	32	1 and 2 1	All 9,19.30
	Access	Access increasing – ward, office or home. Primary school. SofN		1 2	8 4, 10
	Ownership	More computers owned or loaned Increased availability/access		1 2 2	17, 38 4, 15, 30
	Alternative technologies	Mobile phones Internet café		2 1	26 30
	Hospital developments (informant suggestions)	Individual computers/laptops Funding scheme/reduce cost Computer centre – install		1 2 2 1 2	17 26 26 All 15, 35
Barriers to ICT development	Infrastructure	Quality of signal poor	6	1, 2	38, 10
	Accessibility	Lack of computers, limited access		1, 2	8, 38, 15, 35
	Limited training	Exposure limited Time delay		1, 2	19, 26, 31
	Lack of experience	Never used a computer or very limited		1, 2	9, 19, 30 Others limited
	Fear of computers	The ‘machines’, losing information typed in		2	10
	Wastes time	Trying to get people on board (time consuming)		2	4

Theme/ domain	Categories	Sub-categories	MAXQDA aggregate responses	Focus group 1 or 2	Informant
	Funding/cost	Internet café too expensive		1	30
Education/ training	Training received	Some during degree courses in other locations Basic training received	19	1 1, 2	8, 17, 38 Most
	Training available	Basic skills available to all staff		1, 2	All
	Skill level	Searching internet		1	38
	Disseminating information	Key people to lead Library development More books and computers		1	17, 38
Learning theories	Exposure	Examples in experience and training		2	26

Computers and ICT development

This theme or domain is composed of categories including experience of informants using computers and the internet, access to computers and ownership, further developments and alternative technologies. Each category with appropriate quotations is detailed below.

Experience using computers and the internet

Informants' experience with using computers varied in both groups. Two informants (17, 38, FG1) had personal access to a laptop computer for education. Both were undertaking degree programmes. Three members (Informants 9, 19, 30) of FG1 had never used a computer or accessed the internet before, but they had seen others using it including hospital management. In FG2, all informants had previously used a computer. There was some discussion in both groups where informants shared their experiences. Much of their experience of using computers was only during computer training, and most informants have had very little or none since. At least four informants had computer training when undertaking a nursing degree or tutor training in other hospitals. Informant 8 suggested, and Informant 38 agreed, that:

> *…it's self-learning now….* (Informants 8, 38, FG1)

This comment implied that training at the hospital location, although available, was limited. An establish programme of computer training was offered by the IT department, but this consisted of basic skills training only.

Informant 21 added that she had:

> *…not had training but knows how to use it….* (Informant 21, FG1)

Again, not all staff have availed themselves of training. Informant 21 then asked the other informants about the type of training provided by the hospital as she had not yet taken part. Informant 19 said:

> *…the training was so long ago that we have forgotten…* (Informant 19, FG1)

Access to computers

Having access to computers was considered vitally important to 'further skills development'. Three other informants agreed that:

> *…we are in the modern world, we need someone to teach you and to introduce new developments…* (FG1)

Only two informants in FG1 and three in FG2 had direct access to a computer at home, on the ward or in the office setting.

Informant 26 commented that:

> *… (I am) …not an expert. Some of us have had some lessons but because we did not have computer 'exposure' we have not practised, and it is really difficult for me to use a computer if I don't have someone beside to help decide what I want so the experience is very poor…* (Informant 26, FG2)

Informant 10 added:

> *… a lot of us have (experience)… maybe when we are training… and have access to some computer for a short time and that does not give you enough time, even a confident student… when you don't have it when you want to do something… I find I have to move and go somewhere… the internet hasn't proved good, when we have the time, we may have no access so that time you have set... is missed… is lost…* (Informant 10, FG2)

The remarks also confirmed comments about internet unreliability and poor signal at times, and not having enough training to feel confident or competent to use a computer without support. Informant 38 (FG1) reported access to computers in the school of nursing had changed, reducing from one to none. The signal was also said to be poor and unreliable, making searching for information for teaching difficult. Informant 8 (FG1) also expressed a wish for more computers to be available in the school. These comments contrasted with others who reported a better internet signal and increased availability of and access to computers in the hospital community.

The above comments suggest that the training provided at the hospital is limited to an introductory session, and unless staff had access to computers either in the workplace or personal access at home, then keeping up their skills is dependent on

them accessing the primary school or at friends' houses which was not always convenient.

Further developments and alternative technologies

Each group were asked about 'hospital developments' and the new IT system that was being introduced to the hospital. They were also asked about their own ideas for ICT development. Informant 4 was working in an area where the new IT system was being introduced. She suggested that computers should be introduced to all departments as it would then support skills development for all staff:

> *…for example, … I learned how to use computers and using the internet in my department…* (Informant 4, FG2)

Informant 26 had access to a laptop in the workplace and related the developments as a challenge:

> *…it still remains a challenge, we used to not have mobile phones (most staff members have mobiles now) and if individuals don't have their own computers… when you are working, and you want to use the computer… someone else may be using it…* (Informant 26, FG2)

Both focus groups came up with suggestions about developments that would support them to develop their skills. Further suggestions for development from Informant 26 included:

> *…Skills would be improved if everyone had their own laptop… introducing a way for people having computers at a reduced cost… so it gives opportunity people…* (Informant 26, FG2)

Informants in FG1 suggested that the hospital should have its own computer centre, rather than having to go to the primary school. They were very enthusiastic about how they would use such a centre to promote their learning and work. FG1 also suggested that development and improvement to access and services was down to:

> *… flexible management…* (Informants 17, 38, FG1)

Barriers to ICT development

Discussion on the barriers to preventing ICT development included accessibility, cost, lack of experience, confidence, fear of computers and time wasting. Informant 30 commented that:

> *…there is a computer centre down the road (internet café) but they only have two computers and one laptop. There is a cost involved so it is off putting…* (Informant 30, FG1)

Although the internet café is considered a development, the provision is limited and the cost prohibitive, so it is not used by the hospital staff. Although there are computers at the primary school for hospital staff to access at no cost, in practice it is not always convenient due to limited opening times. Informant 27 in an individual interview also commented about the advantages and disadvantages to the internet café.

Waste of time and fear of computers

There is prevailing drive for ICT development at the hospital and I asked FG2 group if they thought everyone wanted to use a computer. Informant 4 stated that:

> *…it takes time to convince people, this is an important skill to have but it wastes a lot of time…* (Informant 4, FG2)

Informant 26 responded by saying:

> *…I think it is because everyone is not exposed to the computer, like some of us, I think until everyone finds out and knows how to use a computer, for example when everyone uses the internet, everyone will be on board…* (Informant, 26, FG2)

Informant 10 added an example about the benefits of having computer skills:

> *… sometimes you don't know something is important until you realise that it is necessary for your work, now we are having problems with some people who fail to learn, others have learnt, and yet we are saying if there is somebody who has… some skills they will get the job when the other one may not… I think if the people are interested or not they do it as a necessity…* (Informant 10, FG2)

Similar comments about timewasting (Informant 17) and needing computer skills to do the job (Informant 23) were also articulated in individual interviews.

Informant 10 went on to comment about *'fear of computers'*:

> *What if the computers come to us in the wards? I know somebody in the hospital who didn't want to have training... they thought that was too much. Then there are others who wanted to use it… they cannot even type or have an email address… I think there is a lot of fear… we fear these machines… for me what if I type something and that information disappears and then if the screen goes blank… so in a way exposure gives a little more confidence … necessity as part of one's work… also it encourages you to do something… those of us who are still here… typing user name... It's high time we made some progress….* (Informant 10, FG2)

Informant 10 also added that:

> *…those interested in the bible can access it online…* (Informant 10, FG2)

The exchange was between three informants in FG2 who have relatively well-developed computer skills, and are enthusiastic about skills development.

Education and training

The training informants had received was discussed in both focus groups. In FG2 following the discussion on access and exposure to computers, there was agreement from the group that:

> *…although all had had an introduction, it was limited, so it was like 'exposure' not really proper training…* (Informant 26, FG2)

Informant 31 reinforced what was said:

> *…I think the problem is we learnt a little of the computer then we forgotten most of the things… searching for info, opening the email… the problem is everything we learnt it ended there… that's the problem…* (Informant 31, FG2)

Informants 15 and 35 added that there were:

> *…no computers to support the training"*

and that a:

> *…dedicated room in the hospital was needed….* (Informants 15, 35, FG2)

Again, these comments further supported the information that although computer skills training was offered, it was at a basic level. Unless informants had reason to

use a computer in the workplace or for education, then skills development did not occur or was limited.

In the CPD programme, USB sticks were provided and how to search for research articles and information was included in the evidence-based practice (EBP) sessions. Students in both focus groups were asked if they printed off the research papers provided on the USB stick. Some had done, but other had not due to personal accessibility. Students agreed that with training and accessibility, they can use information that is relevant in the workplace. Informant 17 added that:

> *…care should be better if everyone could have an individual computer. It is very essential when thinking of EBP and in the library to search for information…* (Informant 17, FG1)

Further discussion took place on ideas for disseminating information. It was suggested by Informants 17 and 38 that:

> *…one person from each specialty could disseminate to others. In addition, development of the library was suggested with more books plus computers, so people can surf the net…* (Informants 17, 38, FG1)

Informant 1 gave an example of having been given a flash drive and now being able to access online materials and textbooks, so:

> *…a computer is very, very useful.* (Informant 1, FG2)

Learning theories

Exposure to computers was raised by Informant 26 (FG2) who proposed that until everyone was familiar with how to use a computer and had access to the internet, they would not be fully supportive. This was in response to Informant 4 who said that using a computer is an important skill to have. In the early stages of computer skills development, exposure to and observation of how computers function, for example through basic training or by seeing other people use them, is a necessary process. Informant 10 also added that the importance of having computer skills may only be realised when it is necessary for your work. Again, Informant 4 gave an example – that she had learned how to use computers as part of her job because of the ICT developments at the hospital.

Summary and analysis of individual interviews and focus groups

Spradley's domain and taxonomic analysis principles were applied to analyse individual interviews and focus group discussions.

Componential analysis

This stage of analysis involved looking for dimensions of contrast within the data (McCurdy *et al.,* 2005; Spradley, 1979, 1980). As identified at the end of the second visit, differences in understanding about computer technology and implications for learning were beginning to emerge. The data collected from the focus groups suggested that the availability of computers was increasing in the hospital departments due to developments in the IT system, and increased members of nursing staff owned or had access to a computer at home or in the ward or office. These developments in accessibility and availability contrast with some of the individual experiences of the nurses. Nurses who had greater access to computers had a higher level of computer skills development. For example, informants who had a laptop to undertake degree studies, those who had undergone computer training elsewhere and those who had been taught specific skills resulting from the IT developments at the hospital all had better developed computer skills. This was concluded through responses to questions asked about computer training received and access to computers. Other evidence of skills development was obtained through individual interviews and participant observation. In addition, although a suite of computers at the primary school on the fringes of the village is available for general use by nurses, the location and the available opening times are not always convenient or conducive to further learning.

There are also differences in reported quality of the internet signal strength: some informants did not appear to have difficulty accessing the internet, whereas others were not able to access it. This again may reflect the level of skills development and access to functional machines. However, there has been an issue with signal strength at different times depending on maintenance and national infrastructure, as well as heavy rain that disrupts day-to-day signal quality.

December 2012 – The fourth visit

Introduction

This visit was shorter than the previous three visits, but further interviews and one focus group were planned, along with continuing participant observation.

We were on site for seven days, firstly to undertake an evaluation of the project and secondly to complete research for this thesis. I planned to undertake informal spontaneous conversations as part of participant observation, formal interviews and one focus group. The individual informants for both formal interviews and focus groups were identified as opportunities arose throughout the visit. I anticipated that I would formally interview any informant whom I had interviewed or had conversations with in previous visits if they were available. I also planned to conduct a focus group to include previous informants and any new staff who wanted to participate. The invitation to participate in the focus group was announced after the first chapel service attended following our arrival. The focus group was conducted midpoint, four days after arrival on Wednesday morning, immediately following the chapel service. This was a convenient time as informants were all in one place. The formal interviews were planned to happen both before and after the focus group at the convenience of the informants.

Participant observation and informal conversations

In the 20 months since my previous visit there had been substantive changes in the senior management team and nursing staff in the hospital and school of nursing. Several nurses and senior management team members had left the hospital and moved on to other positions in Uganda. The evaluation report identified that some nurses had gained promotion and pensionable employment in government hospitals, and others in government departments elsewhere in Uganda (Gidman & Wilson, 2013). Some of the reasons for staff leaving were raised by informants in some of the interviews.

During participant observation, five significant conversations took place with Informants 5, 13, 21, 22, 29.

On arrival at the hospital, a brief meeting and conversation took place with Informant 21, the new Acting Head of Nursing (AHofN), following retirement of the previous incumbent. The meeting was to clarify the purpose of the visit, and to arrange a meeting with the senior team and an individual interview. In a focus group held to evaluate the project, the AHofN identified that there is still a lack of computer availability for nurses to continue to access current evidence and to continue their own professional development (Gidman & Wilson, 2013). An informal conversation took place with Informant 22, who was the Acting Head of the School of Nursing, appointed after the previous post holder had left the organisation. Although a long-term employee of the hospital, she had not participated in the CPD programme. A very brief conversation took place where she stated more research was going on, but this was not clarified. New equipment and computers had been purchased for the school of nursing, which was welcomed as it will:

…enable building on education programmes for the future….

Informant 29 had attended a sonography programme in Kampala for six months. This consisted of a combination of lectures, reading and online resources, but accessing resources online from the hospital is difficult now due to poor internet coverage (Gidman & Wilson, 2013). She had ongoing computer training and online development of skills on the full-time programme necessary to develop skills for the new job role. This is an example of hospital investment in staff by sending them away on full time courses to the capital city. She also had a USB stick with complete online programme materials and photographs (sonographs) for learning. In the previous visit, informants discussed their training and those who seemed more proficient had learnt computer skills as part of undertaking further professional qualifications.

A short discussion took place with the new medical director, Informant 13. The conversation focused on pharmacy audits, prescriptions and implementation of the new IT system in the hospital. This was an interesting conversation that confirmed that the IT system introduced in my previous visit had continued. Other issues were discussed concerning clinical governance, staff salaries and integration of the

workforce. It was noted in the conversation that although higher salaries could be commanded elsewhere, medical and nursing staff preferred working at this hospital location because it was a faith-based community where families could live and work. The facilities, including the water supply and hydro-generated electricity, made this possible. A short conversation was held with Informant 5 who led many building projects at the hospital and employed local workers. I took the opportunity of asking him what he thought about the impact of technology on the local populations, and how they viewed the outside world. He considered that it had no impact and described the developments as being:

…like water off a duck's back…

The informal conversations provided some new information about the changes in hospital personnel and opinions about the impact of technology on the local population. However, comments made by other informants during the previous visit did confirm the local population are unaware of the computers and the internet.

Table 5.19: Summary of informal conversations with informants, 4th visit

Informant	Occupation/ role	Summary including folk and analytical terms
5	Engineer	"…like water off a duck's back…"
13	Medical director (new)	IT system implementation. Staff salaries v. faith-based hospitals. Integration of workforce. Water supply and hydroelectricity
21	Acting head of nursing	Lack of computer availability for nurses limiting professional development
22	Senior tutor SON	New equipment and computers, education development. More research ongoing
29	Senior nurse	Computer training in Kampala. Skills development for new job role. Learning programme on USB stick. Poor internet coverage locally

A domain analysis of the informal conversations, including categories, is included overleaf.

Figure 5.7: Domains and categories

Computers and ICT developments	Barriers to ICT develpment	Education and training	Culture
•New ICT system implementation •Integration of workforce •Hydroelectricity and water supply •Computer training •New job roles	•Staff salaries and faith-based hospitals •Lack of computer availability limiting personal development •Poor internet coverage locally	•New equipment and computers •Education development •More research •Learning programmes on USB sticks	•Impact of technology on the local population

Designing the questions

Following domain, taxonomic and componential analysis (Spradley, 1979, 1980) of data from the previous participant observations, informal conversations, formal interviews and focus groups, further questions were raised concerning wider cultural and political factors that influence the provision and use of technology. The approach taken to the second set of interviews and focus group was designed to explore these factors in more detail where possible, and to promote a greater understanding of the potential of computer technology and its impact in the longer term. These types of question are termed 'mini tour questions' by Spradley (1979) and aim to explore more specific areas of culture. For example, I planned to ask one question, then allow the informant to talk freely interspersed with prompts designed to stimulate further responses in areas not approached spontaneously by the informants. Each interview was anticipated to provide a range of perspectives and unique contributions to furthering the research. The overarching question concerned use of computer technology in relation to the CPD programme, and further questions based on the prompts were asked and individually tailored within the course of the interview. The opportunity for contrasting questions to be asked also arose – an example is given below:

> Can you identify and discuss any specific cultural and/or political factors that have influenced the provision and use of computer technology?
>
> Prompts for further questions:

- Factors may include availability and accessibility of IT and computers for 1) personal use and 2) IT development in the hospital setting for development of new systems.
- The use of and availability of IT may be influenced by local customs and fear of technology, as well as difficulties related to technical bandwidth and satellite connections.
- In a broader context, national policy drivers may determine the inevitability of change, but local factors may dictate the pace of change.

Individual interviews

A total of twelve interviews took place with a total of fourteen informants. Two joint interviews were held with two informants together, at their request. Informant 38 was interviewed on two separate occasions. Six of the interviews were recorded and a further six interviews were unrecorded. Two of the recorded interviews took place in the UK in the following year, with two informants who had left the hospital location to work in government hospitals elsewhere in Uganda. These two interviews were analysed separately and enabled respondent validation to take place following the fourth and final visit in the previous year. As in previous interviews, a summary sheet was provided prior to the interview and a consent form signed.

Table 5.20: Recorded and unrecorded interviews

Date of interview	Recorded interviews	Job role/ occupation	Duration/ minutes	Unrecorded interviews	Job role/ occupation	Duration/ minutes
December 2012	Informant 17 Informants 20 + 38 Informant 26 Informant 31	Senior nurse Nurse tutors Senior nurse Senior nurse	60 35 40 60	Informant 2 Informant 7 + 12 Informant 19 Informant 21 Informant 27 Informant 37	Senior nurse IT x 2 Senior nurse Senior nurse Hospital admin Medical director	30 45 40 20 45 60
UK 2013	Informant 28* Informant 38*	Head tutor Senior tutor	45 80			

* Note that Informants 28 and 38 were interviewed in UK during 2013.

Introduction to each interview

Before each interview commenced, I outlined the previous visit and summarised the key points from the analysis of interviews and focus groups to each informant. The purpose is to remind the informant and to stimulate any further discussion on what was said before, either by themselves or by others. This was also part of respondent validation. This would form a platform for further responses on significant areas. Four of the informants had previously been interviewed in the third visit and a further nine informants had taken part in focus groups (see Table 5.15).

Domain, taxonomic and componential analysis of the interviews and participant observation data from the fourth visit

Interview and informal conversation synthesis

The domains, categories and taxonomies elicited from individual formal interviews and informal conversations from the fourth visit were integrated under five domain headings, and correspond to the themes used for analysis and synthesis of the data. One informant contributed to the data via informal conversation and interview. This information is integrated into the following table which summarises the domain and taxonomic analysis of the data, and provides a framework for synthesis and componential analysis of the data using domain headings as themes. Participant observation and informal conversations are referred to where relevant to the analysis.

Table 5.21: Domain and taxonomic analysis of 2nd set of interviews and informal conversations, 4th visit

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
Computers & ICT developments	Computer provision	Increased number of computers	20 new laptops SofN	Cause-effect X is a result of Y	26, 31, 17, 20, 38
	System development	Change in provider Hospital reputation growing due to C & ICT developments	New roles Centre of excellence		21, 7, 12, 27, 2, 37
	Increased access to computers	More using computer with job Impact on education and skills	Staff empowerment		
	Infrastructure	Signal still variable	Weather		
	Increasing communication	Teleconferencing International communication WWW and news, current affairs Social media, games, music	Knowledge sharing More people accessing information		
	Power	Hydroelectricity, water supply In most homes	Hospital developments		
	Alternative technologies Internet café	Televisions Closed (since last visit)	People more informed		
Barriers to ICT development	Wider context of Uganda and Infrastructure	Electricity not available everywhere Cabling Signal strength	Cable damage Can be turned off – visiting dignitaries Weather	Cause-effect X is a result of Y	26, 31, 17, 20, 38 21, 7, 12, 27, 38

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
	Lack of knowledge and experience	Not all government officials have email addresses	Not aware of technology		
	Limited access	Time and location (primary school)	Nurses stopped going to primary school		
	Training	Not all rolled out – some slow to learn			
	Staff turnover	Attracting new staff difficult	Marketing campaign		
	Costs/ affordability	Personal ownership To organisation	Costs prohibitive Running costs determine level of internet provision		
	Computers – quality of and sustainability	Some old, not working	Concern for future issues regarding updating		
	Charity influence	Funding and staff appointments	From UK (can be seen positively or negatively)		
CPD/ education/ training	Good practice	Taken to whole of Uganda Teaching programme in SofN	Dissemination of new ideas New students' basic and advanced skills – MS Office	Rationale X is a reason for doing Y	26, 31, 17, 20. 38 21, 7, 12, 19
	Computer skills, knowledge and development	Staff learning new skills – necessary for study, work and personal use	Email, downloading, Web and PowerPoint		
	Clinical updating	Learning through technology	Learning for work – enhancing teaching		

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
	CPD programme	Web, USB sticks, CD-ROMs	Leads to more responsibility Supported		
	Educational materials	Online learning Keeping up to date CINAHL, Cochrane, JISC	Infectious diseases e.g. Ebola, HIV, family planning, drugs information, research		
	Teaching and learning strategies	More students using internet, increased ownership, videos, DVDs, group work	Developments in midwifery and diploma programme		
	Learning theories	Regular 'exposure'	Knowledge expansion		
Culture	Impact of technology on culture	As technology grows and develops, leads to cultural change – professional and social	People thinking differently People challenging status quo (clinically and socially)	Attribution X is an attribute (or characteristic) of Y	26, 31, 17 27, 2, 19, 37
	Impact of culture on technology	Lack of knowledge and experience	Holding back development		
	Fears about computers	Damage Misuse Reducing with more experience	Breakages Pornography Corrupt purposes		
	Cost/debt	Technology leads to debt	Micro-loans		
	Culture of communication Oral culture v ICT	Telephone, radio, churches, mosques, parties, burials	Word of mouth rather than through technology Relatives take messages back		
	Hospital 'state'	Internet, power, electricity, water	Self-contained		

Domains Level 1	Categories Level 2	Sub-categories Level 3	Sub-category Level 4	Semantic relationship	Informant
	Alternative cultures (exposure to)	BBC Online, Reuters, Sky Current affairs	Expanding knowledge		
	Social media	Facebook	Others		
	Culture of learning	Class, notes, coursework, exam	Paper, not internet, but changing		
	Political awareness	Political views, disease outbreaks	People more informed		
	Influence on lifestyle	See and copy other behaviour and dress	Impact on traditional way of life		
	Population impact	Maternal and neonatal/infant deaths declining	Fewer birth attendants/more attending hospital. Transport links		
	Culture of care provision	Increase in prostitution, HIV	Increasing population		
Policy	Computer policy in schools	All children taught to use computers	Will filter to all people?	Rationale X is a reason for doing Y	26, 17, 20, 38
	Government ICT policy	Telecommunications and electrification	Bigger institutions more active		27
	Nursing policy – e-learning programme	Increase number of midwives	Increase number of computers		
	Funding policy	Zambia model	Adopt in hospital		

Synthesis of interview and informal conversation data

The second set of interviews generated a large amount of data which elicited the same domains and categories as the first set. These illustrated changes and developments in ICT, education and training, and some continuing barriers, but the emphasis on culture and policy was greater with a broader range of categories. This was partly to be expected as the questions were purposely designed to explore culture and policy in more depth, and to ask contrast questions to elicit differences in meaning. However, some of the content was unanticipated. The synthesis of data in themes is detailed below.

Computers and ICT developments

The domains and categories that emerged from the interviews provided additional data from the previous twenty months about computer provision, access to computers, the infrastructure, communications and alternative technologies.

Computer provision and access

At the beginning of the visit an important interview was held with Informants 7 and 12, who were computer technicians at the hospital. The interview also included participant observation, consisting of a walk-around tour of the new offices and outpatients' department that was the focus of the technological change within the hospital. The roles of these informants were clarified as they had evolved since the previous visit. Informant 7 leads on technical issues and hard and software systems, and Informant 12 on staff training. They explained the system, processes and staff roles, and that staff were using the system with more confidence. Training of clerical staff and some of the nurses who worked in the departments was ongoing; it was intended to roll out the system to all the hospital as indicated by Informant 27 in the previous visit and confirmed by Informant 26**.** Training on the new system differed from the basic computer skills training offered to all nursing staff and students. There had also been 20 additional laptops provided in the hospital, some to the school of nursing, increasing access for nursing staff and students. The infrastructure is developing nationally, but in the short term there are interruptions creating short term barriers to development.

The joint interview with Informants 20 and 38 describe some of the comments made about the new computer system now it had been up and running since the previous year:

> *…there are some comments that have been raised about those computers… we see patients and some of them (clerical staff) are not so quick… they take time and there is a whole line of patients waiting… there is a lot of delay here in the computer system… a lot of them are not fully trained….* (Informants 20, 38)

Informant 26 also considered the technological developments and introduction of the new computer system in April 2011 as still being a challenge for many people:

> *…In the future it will improve things, in the beginning it was a bit slow because people are still slow to use computers… but people now have good skills… pharmacists and outpatients are using it and we feel it should be connected to all wards and then they would improve….* (Informant 26)

Informant 31 also talked about the changes to development of and access to computers that had occurred in the hospital over the last three or four years. Indeed, since the last visit, he had been gifted a personal laptop and his knowledge and skills were fast developing, along with his enthusiasm. From his personal observations, there was an increasing political awareness:

> …more people are accessing computers and getting online and seeing the world through news and the internet…. (Informant 31)

The interview with Informant 17 started with how he saw developments in the hospital since my last visit, and whether more people owned their own laptop or computer and their reasons for doing so:

> *…yes, more people have computers or laptops… there are several things… one thing is that people have more access to educational materials (online)... if they want to use it for learning it's an opportunity… for some young people the computer is for playing and recording music and others it is for social media like Facebook so when they are on the computer they are on Facebook... some people are using it the wrong way and wasting time… But for others like doctors and nurses it is for information and communication….* (Informant 17)

Informant 21 was forward thinking in her approach and described the main aspect of having access to computers as:

…empowerment of staff… (Informant 21)

More nurses have personal access to computers. However, although all nurses have the opportunity for access to computers and the internet at the primary school computer centre, many had stopped going due to limited opening times and location. This point had been made previously by other informants.

Communication (in relation to clinical updating)

Although Informant 26 made the previous comment about intermittent internet connections, she was the only person interviewed who had been involved with and engaged in teleconferencing. This is a major advance and reflects developments in the ICT system and in the personal skills development of the individual.

> *…they have training in Rwanda… by teleconference… with the help of another person I was able to connect… there were people from London and South Africa on the call… if we cannot attend a conference, they will send handouts…* (Informant 26)

Informant 26 had benefited personally by professional updating, communicating internationally with specialists and disseminating that knowledge to others in the hospital to improve patient care and reduce infection rates:

> *…It is very useful, for example airborne diseases… you get other bits and you know what other people are really facing… that's how you know what to tell people… as an infection control nurse now I try by all means to make sure I am updated. When I hear news, I try to look for information about a new disease that has come into the country like Ebola... and say we must be on alert… talk to physicians about symptoms and how they can identify it, so everyone is alert…* (Informant 26)

Communication was also discussed with Informant 31 who outlined alternative methods of communication other than the internet, which reflects the strong oral culture of communication that still exists in Uganda and throughout Africa.

> *…communication is by mobile phone, radio, churches, mosques, parties and burials… when relatives come to see the patients we teach them, and they take the messages back…* (Informant 31)

Electric power supply

The constant supply of water and electricity is cited by informants as fundamental to the success of the hospital. The developments in ICT and provision of up-to-date

hospital care and treatment services are dependent on the hydroelectric scheme, which in turn generates a constant supply of electricity. Informant 31 commented on the impact of having an electric power source in the community, by firstly saying that the hospital is becoming like 'a state' because it is self-sufficient:

> *…today we have been discussing in the staff room that the hospital is becoming like a state? We have the internet… what you are seeing is not as common in Africa… it is very expensive to maintain… another thing every visitor… the first thing they appreciate is internet and power and water… in Kampala a five litre jerry can of water is 500 schillings… imagine the water we are having… when you go to toilets there, you don't want to go back there… here we have constant water supply, power 24 hours, to cook we use power but it's very expensive (outside the hospital and village) but if you have quarters you find the staff using power….*
>
> *Other hospitals have no power or water… they bring in containers…*
>
> *So here we have the internet, but cannot use it without constant power… our students here are doing very well because of the technology…* (Informant 31)

Informant 17 commented on how electricity and abundant water supply are an attraction to new workers which contributes to mobility and knowledge sharing in Uganda. He also described some of the difficulties experienced by staff in recent weeks about a suggestion that staff pay for the electricity supply (in their own homes). This did not go down well with staff, but the aim is to supply electricity to all areas of the hospital and to generate income for surrounding village areas from any surplus as far as practicable. He continued by talking about his own experience of having no electricity:

> ***…****When I go to my home (family home) I have no electricity… accessing knowledge is one of the things keeping me at the hospital… in the surrounding villages here at the hospital, those that can afford it (electricity) can have it… Some are not aware that there is such technology… they think one can get addicted… time on the internet… instead of concentrating on work…* (Informant 17)

Alternative technologies

Informants 20 and 38 commented on the general impact of technology on changing people's lives and attitudes, including student nurses:

> ***…****yes a big change (laughs)… when I came here there were very few families with TV sets, and just for watching a DVD or something… now it is just about*

> *in every home... and because of that people's thinking and reasoning changes… they are able to express things and talk about issues… they are able to talk and express themselves well... just because of the influence of whatever they watch…* (Informant 38)

> *We have a TV here for the students… but I don't know if it the same here as the UK… English football… if they are not allowed to watch it… sometimes their minds are not in academic issues – sometimes when you want them to concentrate on something academic… sometimes they want to watch at the wrong time.* (Informant 20)

Informant 2 also stated that televisions were now a feature of most homes in the village in an unrecorded interview.

However, Informant 17 doesn't have a television, but commented on obtaining sources of information:

> *…Like for me I don't have a television and I don't buy newspapers, but I find myself so well informed and up to date about what is going on around the globe… I get it from Uganda news media called New Vision, BBC Online and Reuters and sometimes I get Sky News and the radio…* (Informant 17)

Informant 38 also commented that the internet café that was newly opened in April 2011 had since closed through lack of use. There was no explanation for this, except more hospital staff were accessing computers either personally or through their jobs, and the local population probably could not afford to use it. Any visitors to the hospital with smart phones or laptops could obtain a password for the hospital internet. In time, he thought, it could become viable again with sufficient demand.

Barriers to ICT development

There continued to be barriers to, or factors causing delay in, ICT development at both national and local levels relating to infrastructure, lack of knowledge and experience, limited access to computers and training issues. Staff turnover and skill loss, recruitment, personal costs of computer ownership, organisational running costs, sustainability and charity influences were significant factors. The interview data illuminates some of these factors and the rationale for their presence.

Wider context of Uganda and infrastructure

There continued to be physical barriers to ICT development at organisational level in the wider context of Uganda. Developing and constructing the infrastructure and cable network frequently interrupted the signal, especially to remote rural areas. Comments from informants indicated that although the internet signal strength is improving, there are still problems at times resulting in disconnection. This may be a result of environmental conditions such as weather and heavy rain, road works, cable damage or deliberate disconnection. This impacts on individual access to the internet as well as central hospital systems. At the time of this research, Informants 7 and 12 commented about current system problems. It is unknown how far these have been resolved:

> *…There are problems at times with the main internet system and crashes on most days. Currently, there are cable problems from Kampala. There can also be problems if dignitaries are visiting in the area resulting in the internet being temporarily disconnected…* (Informants 7, 12)

Informants 20 and 38 also stated that they had experienced many interruptions in the internet signal this year. A broken cable was suggested as a reason for this, concurring with Informants 7 and 12. Informant 26 confirmed that the internet signal was intermittent, but offered no explanation:

> *…at times our internet is on and off… sometimes you want to practise, and it is not there….* (Informant 26)

Limited access and experience

Informant 21 commented on the lack of access to computers and experience, something that continues to be of concern to staff. Although all nurses have the opportunity for access to the internet at the computer centre in the primary school, she reported that nurses had stopped going. Many nurses who have had the training have an email account and USB sticks, but problems with the internet and limited access result in only a few people who use it unless it is required in their work.

Lack of training

One-off training and rolling out of training can be a barrier to development. Some staff, although they had received training, had no opportunity to practise their new skills. Informant 31 reported that he had forgotten the training he had received, due to lack of practice because it was so long ago. However, he was now learning fast as he had been recently gifted a laptop. Informant 17 commented that his computer skills training was only an introduction, and he was self-taught through self-discovery. Informant 26 also commented that, in her opinion, lack of knowledge and experience in using computers was *"…holding back development…".*

Staff turnover

Informant 27 reported that when staff had gained new skills, some were leaving the hospital to take up new jobs elsewhere in Uganda. This was a direct result of the new systems development. Recruiting and attracting new staff can be problematic, but he reported that the hospital was gaining a reputation as a centre of excellence which should help with recruitment of new staff. In turn, new staff would need to be trained in computer skills.

Costs

On the tour round the ICT facilities at the hospital, Informant 7 commented on the running costs of the server; although the actual cost was not disclosed, he commented that more investment would improve the system. When interviewing informant 27, he too commented that the cost of the internet and sustaining it was a concern for the future. In the previous interview in April 2011, he also commented on the cost to individuals and the dependence on power supply for the internet.

I asked Informant 26 why she thought the uptake of computers is slow in Uganda. The answer focused on the cost of computers to the individual and to the institution. She explained that the benefit of learning was to improve personal knowledge of effective treatment and drugs which in turn will help to improve the hospital. She gave as an example that, although costly, computers will bring reductions in costs for control of infections by making it easier to implement

effective treatments. However, the concern was that computers are too expensive, so developments are slow.

The cost of computers was also a factor in leading more people into debt. Informant 2 described how people were taking out micro-loans to pay for electronic devices.

Charity influence

I interviewed an informant who outlined how the hospital is partly funded through charitable donations and fundraising in the UK, which is a positive perspective on its continued success. It was also stated that the charity can influence decision making and practice in the hospital, and staff appointments are made from a distance, which can be considered negative influences. A concern was reported that staff using the internet more widely could lead to irresponsible personal use, and may be a factor in restricted access unless connected directly with hospital applications.

CPD/education/training

CPD programme and good practice

The CPD programme was discussed with Informant 37. We looked back at the project and cultural change that was occurring at the hospital, which was seen positively because it had enabled people to challenge situations; and although it had led to people leaving the hospital, they were able to take that knowledge with them:

> *…the project has changed the way people think and challenge situations… people leaving the hospital is criticised… but they are taking good practice to the whole of Uganda and new ideas – this is already happening…* (Informant 37)

Informant 17 commented on how the CPD course had helped him access sources of information from round the world using the internet:

> *…Most websites don't have references and since doing this course I know the importance of references, so I end up going into libraries (university website) ... I got CINAHL, Cochrane, I even use JISC library for social records… there is also an opportunity for communication if somebody sends emails and attachments with details for information… it is cost-effective as in the UK I*

wouldn't be able to spend all that money on airtime… Being at the hospital… you don't have to pay as you can use the server… but as you say there are problems with that sometimes… (Informant 17)

Training and skills development

Informant 26 during the interview reflected on her own experience of self-learning, exposure, hands-on practice and discovery through access to computers. She commented that people are becoming more aware of their (training) needs:

…the good thing I would say is… now people know their need… at first I even didn't… I am lacking it… so I think this is also good to know… you are lacking it… but we didn't know we even needed it… that's a big step and now that people know that they need it… some people have even started buying… (Informant 26)

Other informants commented on the level of their own computer skills development and the training received. In common with Informant 26, Informant 17 was mainly self-taught.

Clinical updating

Informant 31 was a senior nurse working on a ward. He gave examples of clinical updating via the internet, however the increased access to knowledge has led to frustrations. The problems encountered were that although they can find information about the latest drugs available in the UK or other parts of the world, they are not necessarily available in Uganda or locally. Availability is attributed to costs and affordability impacts on patient health outcomes:

…first of all, we look at our clients… most of the patients in the community have HIV, psychosis, etc.… when we are introducing a drug… the problem is it is not consistently available in the store… so we look at the market and see if this is a good drug and if available 24 hours, this month, next month or maybe out of stock… the most important thing is our patients getting better so you can be frustrated because the drug is out of stock and this patient is going to die or going to suffer… we try hard and compensate with drugs that are available… (Informant 31)

Educational materials and online learning

Some of the interview with Informant 17 focused on personal development, availability of online courses, funding issues, and some of the challenges that online

learning brings such as time management. He was currently taking an online course so had experience in this method of learning:

> *I wouldn't feel comfortable to take another online course. I would need more time off full or part time to do another course such as master's… I am very busy and there is no way you can manage just as an evening course, and cannot manage weekend studies because of transport… so e-learning would be helpful for people working here – if they are working they need the opportunity to study, but without getting time off work. It is good to study if you can support yourself…. In the future I am also interested in public health… I felt I should get an opportunity to do something different from community health studies…* (Informant 17)

Learning theories, and teaching and learning strategies

Informants 20 and 38 talked about learning theories, and teaching and learning strategies, and how these had developed since more computers had become available for teaching and learning. I asked about how using computers impacted on learning. Informant 20 explained that:

> *…it must change them if you are limited to what you know – so getting that wider knowledge and being exposed to what is taking place, and think that most of them know that to work here, stay here, be here – they are interested in knowing where they will be in the future….* (Informant 20)

Informant 38 added further information about what the students are learning and how this is based on information garnered from the internet:

> *…today the students are looking at disease outbreaks… political awareness and political views…* (Informant 28)

Informants 20 and 38 agreed that the students were getting regular usage and exposure, but for the hospital staff nothing had changed. I also asked how much they considered computers impact on the student's professional lives and if any students owned their own computers:

> *…we have a few students with laptops, we are teaching them and guide them to keep searching for that knowledge for practice, give encouragement, maybe they want to read, search for more knowledge….* (Informant 38)

> *…they get vast knowledge, maybe more than they would get from class and reading books… on the internet… care and drugs and important information…* (Informant 20)

Methods used by students for searching the internet were discussed. They thought that Google was the main source, not specific websites. I enquired about teaching and learning strategies and how they were changing:

> *…yes, because it was teacher centred, stand and talk and people listen, I think it has changed quite a lot. Right now we are involved in the training – videos, demonstrations, DVDs… we are projecting, and students are watching… then those DVDs have exercises according to the video. Then we are engaging them more in group discussions, and then they come and present and search for information on the internet – go search, come back, present and then discuss. They get a lot of information, more than you were expecting…* (Informant 38)

> *…the diploma students add to the information you already have, and data, so it is really important, when they are given assignments there are many textbooks that they would not reach, they search, they use, and they are enjoying it, they do not forget the presentation…* (Informant 20)

Informant 26 also supports students on the ward, and when time allows will show them how to search for information:

> *…let's look it up… come into my office and let us search and then we come to know… people take poisons and you want to know a drug and you can get answers… (Informant 26)*

Not only are computers beginning to transform learning in the classroom, there are now examples of learning in practice because of the development of staff computer skills.

Culture and the impact of technology

The interpretation of culture can take many forms, but in this analysis, informants have specifically identified how technology has influenced and impacted on different aspects of culture – and vice versa, how culture has influenced the introduction of technology and its subsequent utilisation in education and professional and social life. The detail provided by informants has added to data obtained in previous visits. The following section provides evidence of the influence and impact of technology on the culture and population including: lifestyle; fears about computers; how culture may hold back technological development; the changing culture of communication, including oral culture versus ICT, and social

media and increased political awareness; the culture of learning; the culture of care provision; and alternative cultures.

Fears about computers and holding back technological developments

Informant 26 summarised the cultural influences as fear of the unknown, and commented that lack of knowledge and experience were holding back ICT development. She discussed how she does not own a computer personally, but she uses a computer at work because of her specialist role. The computer enabled her to search for up-to-date clinical information, and communicate internationally through teleconferencing to enhance and develop her role. However, she is not allowed to take it home and this was an area of contention:

> *…right now, I don't have my own laptop, and when I am in the hospital I use the hospital one, they fear if I take it home they destroy it and all of that… but when this project came for example... I had no way I could escape from using a computer. I started by even requesting people to help me send an email...* (Informant 26)

She continued to describe that now she is using a computer regularly, her skills are developing, and the fear is reducing:

> *…every time I go on a computer and reply to my emails, that fear is reducing… I am training people myself… I will be telling them about going on the website and training… I will be telling people they must use a computer and search for things and that's how we can improve… another interesting thing is we have started making our own videos… recently hand hygiene... we are making presentations and we are going to send them… we have made our own posters on the ward... I have told my team to search and look at what other people are doing… I won't fear to tell them that I had very little knowledge…* (Informant 26)

These initial difficulties also acted as a catalyst for Informant 26 to gain more computer skills and to search the internet for information about clinical conditions to enhance her job role.

With Informant 17, I was also able to explore in more detail observations I had made in the previous visit, during participant observation on the ward, and the subsequent interview question concerning culture, the introduction of computer technology and the concept of 'magic'. I was interested in people's reactions to

something so new. The local village community and local population whom the hospital served had largely no knowledge or experience of computers, and likewise some of the nursing staff also had no understanding of electronic devices. Because of their lack of knowledge and understanding, Informant 17 said they believed that computers have 'magical' properties:

> *…in the surrounding villages here at the hospital, those that can afford it (electricity) can have it… Some are not aware that there is such technology… they think one can get addicted… time on the internet… instead of concentrating on work…* (Informant 17)

Influence on lifestyle

The growing demand for technology and the increased availability in the hospital and personal ownership of laptops were discussed at interview with informants 20 and 38. More people were also said to be coming to the hospital because of its good reputation, increasing the local population. I asked if the changes were affecting the cultural and social issues and traditional way of life in the local area.

> *…yes, it's social and cultural, definitely, because traditional values and social things people used to get stuck on… but they watch and see how other people take things, because life changes, they are beginning to understand that people behave differently elsewhere especially the younger generation… they are aware of the ways people behave and dress and aware of different things changing socially…* (Informant 38)

> *…the things we said earlier some are very important for our group to take a negative view… some people tend to copy certain cultures which actually don't suit the community we are in… sometimes contrary to what is ideal according to their culture… some people dress for the weather or work… they wear the same kind of dressing but not for the culture here… of course not knowing why some people are dressing like this… it is the younger generation… some people get stuck and end up misbehaving…* (Informant 20)

Population impact

The hospital throughput was increasing and consequently the village population was expanding, due to the growing reputation of the hospital as a centre of excellence, drawing more people in to use its facilities and to set up businesses. This is accepted as a direct consequence of having a constant electricity supply and the internet impacting on the quality of services, as described by Informant 27.

Informant 19 worked in women's health and was keen to share findings from a recent hospital audit (Hospital Audit, 2012) which provided evidence of reduction in maternal and infant mortality rates and increasing birth rate. This has impacted on an increasing number of local women giving birth in hospital rather than at home, and an expansion of the hospital due to more referrals from outside the area because of its reputation. It is also the only place to access family planning (FP). Transport also carries more people more quickly to employment and to the hospital. More people are attracted to the area as facilities are good and more shops are setting up in the village. Prostitution is a growing problem as the area expands and HIV is also increasing referrals due to 'more visitors'. Although FP cannot be talked about openly, the FP clinics are well attended, and all women are tested for HIV in the clinic.

> …contraception is accepted by women… they are beginning to limit their families deliberately… divisions of land are becoming difficult with too many children and more money needed for school fees, not enough land and property… therefore they limit their families… (Informant 19)

She then went on to talk about some young girls of fifteen years plus who were getting pregnant and coming to the clinic. An interesting reason was put forward about young girls not having enough to do:

> *…young girls socially drop out and if not 'busied up' get pregnant and abused…* (Informant 19)

Thus, as well as the advantages to the local population of hospital developments, greater access to FP, improvements in mortality and morbidity generally, and wider access to electricity and ICT, there are social disadvantages brought with an increasing population and opening up of the area including young girl pregnancies, prostitution and an increase in HIV.

Social media

Several informants considered that the use of social media, including Facebook, is a negative aspect of using computers, which should be primarily used for educative or professional purposes. Several comments about social media and their influence on culture are included below.

Informants 20 and 38 gave an example of using social media and how it is distracting students from focusing on searching the internet for information:

> *The other day I was calling the students and they were surfing and on Facebook… they were chatting… they were sent off for 20 mins then told come back and present – students with laptops start chatting with someone on Facebook… these are some of the negative things…* (Informant 38)

Informant 2 talked about alternative uses of computers, such as using Facebook and social networking; using it for corrupt purposes was a major concern. I asked Informant 26 about what she thought were the negative influences of computers and access to the internet:

> *…sometimes people talk of pornography… it still good for people to know that this is bad practice… rather than hiding it and someone discovers it…* (Informant 26)

Informant 17 also said that:

> *…yes, more people have computers or laptops… there are several things… one thing is that people have more access to educational materials (online)... if they want to use it for learning it's an opportunity… for some young people the computer is for playing and recording music and others it is for social media like Facebook so when they are on the computer they are on Facebook... some people are using it the wrong way and wasting time…. But for others like doctors and nurses it is for information and communication…* (Informant 17)

Informant 7 also confirmed that students are becoming more skilled in use of computers and using social networking sites.

Communication: Oral culture versus ICT

Informant 31 also had an opinion on student learning and how using computers had improved communication and exchanging messages. However, this was still limited by the number of people accessing and regularly using computers. He also talked about traditional methods of communication still being the main methods used:

> *…communication is by mobile phone, radio, churches, mosques, parties and burials… when relatives come to see the patients we teach them, and they take the messages back…*

Interestingly, he included mobile phones and use of the radio as they are now in widespread use and most people have access to these, even in the villages.

Culture of learning

During the interview with Informant 17, I enquired about whether there was a 'culture of learning'. This flowed on from the earlier part of the interview where he described his own education and learning experiences. The culture of learning was raised previously by Informant 26, and the literature review identified that technology was creating a shift from oral cultures (Yagos, 2017). He described the culture of learning as a traditional process:

> *…The culture of learning here to most of the general public, is going to class, taking notes, doing some course work or going to sit an exam. This is the culture…* (Informant 17)

The expansion in the number of computers at the hospital and in the school of nursing prompted me to ask Informants 20 and 38 about the culture of learning, and whether there had been a shift in attitudes towards learning about computers and using them to learn.

> *…I think in school students are more into using computers because we keep saying "Go and find out this" and ask them to look up some things and come back and present… so to us in the school the students are really into it, they access computers and do you know we have computer lessons for our students… first semester and by the time they go to second semester they already have the knowledge…* (Informant 38)

We then discussed what they thought were the benefits of using computers in education:

> *…Skills keep changing and people keep writing books, but I think the knowledge of computers is always updated on the internet – one thing is you are sure of getting information, the second thing it makes teaching easier if you have a video, PowerPoint, mixed teaching… it is quite interesting as students are eager to learn… some are also printing off materials…* (Informant 38)

The comments made by Informant 38 illustrate how the rapidly increasing use of computers and the internet is becoming a new culture of learning contrasting with the traditional one.

Culture of care provision

Technology has also impacted on the culture of care provision by increasing knowledge about available treatments. This has led to frustrations as described by Informant 31 when treatments are known about, but unavailable due to cost and availability, or they may be available for a limited time and then withdrawn. This has negative consequences for some patients who may need to change to a less effective medication.

Policies

During the second set of interviews in December 2012, various national policies that were impacting on local experience and developments were mentioned by informants.

Computer policy in schools

Informant 26 commented on the broader aspects of policy and development in education that were identified as impacting on the duration of change because:

> *…all children are being taught (to use computers) in schools. Others have to study after completing education… some of us are trying to catch up… students in the school of nursing don't have their own, they use the computers in the school library… the IT team goes in and teaches them…* (Informant 26)

Although some students do have their own laptops, the comments demonstrate that the government policy on education is being enacted locally: all local school children have access to computers and learn the skills in the classroom. The computers are shared out of school hours with the hospital staff if they wish to make use of them. Computers are now widespread in higher education and most schools of nursing now have access to computers throughout Uganda (NDP11, 2015). Eventually the skills will disseminate through the population and all levels in society.

Government ICT policy

Informant 17 commented on the government policy on technology and the impact on local people when electricity and technology become more widely available. I was able to pursue this point about the impact of government policy.

> *…the bigger institutions are more active (by way of technology) but there are not much initiatives in technology and communication (locally)…. They are concentrating on telecommunication… now they are planning to concentrate on electrification… I think this is the key… I think it will come in the next year… the way of life would improve generally...* (Informant 17)

However, he made the point that even some government officials don't have email addresses and are not very confident with computers:

> *…You know the first thing people do when they have computers, they have an email address… but even some officials (in government) don't have it…* (Informant 17)

Nursing policy – e-learning programme

Informant 38 raised a proposal by the government to increase the number of midwives in Uganda supported by an e-learning programme facilitated at the hospital. One of the aspects preventing it happening at the present time was the lack of computers in the school of nursing, so it was on hold awaiting further information.

Focus group 3

Locating and inviting informants to take part in FG3

On the first morning of the fourth visit, at the chapel service, nurses who had been previously involved in the CPD training were invited to attend the third focus group due to take place two days later. It was apparent that only enough staff came forward to conduct one focus group. Of those twelve, eight had participated in one of the two previous focus groups and four had not previously participated in either focus group or interview. The four nurses concerned had only joined the CPD programme in the previous year. Following the focus group, six of the informants (17, 19, 21, 26, 31 and 38) were interviewed individually which allowed exploration

of some of the themes in more depth (Crang *et al.,* 2007; Llamputtong, 2011) and to ask contrasting questions (Spradley, 1979).

Table 5.22: Focus group 3 informants

Focus group 3 – December 2012	Duration
12 informants: 4, 14, 17, 19, 21, 26, 31, 33, 34, 36, 39, 40	25 minutes

The following questions were used as prompts to engage the informants in discussing their experiences:

Table 5.23: Focus group 3 questions

1	Confirmation of training and experience (new informants)
2	Has access to computers changed?
3	How have computers assisted your education and learning?
4	If you had greater access to computers, how would you use them?
5	How has technology impacted on your way of life culturally? (Professionally and socially)

Planning for the focus group

Questions were planned prior to this fourth visit, based on the interviews and focus groups that took place in the third visit, and applying Spradley's interview questions format (Spradley, 1979). The group was a mix of previous informants and new members of staff so an initial exploration of computer training and access to computers was undertaken by asking descriptive 'grand tour' questions. These initial questions led into more detailed 'mini tour' questions asking previous informants to describe and explain about changes that had taken place during the previous twenty months, whether there was now greater access to computers and training, and if there were any noticeable changes in the impact of technology on professional practice or the way of life in the village. In addition, a hypothetical question about how they would use computers if they had greater access was asked. The focus group was held in the chapel after the morning service at about 9.30 am at the midpoint of the field visit.

Setting the scene – summary of previous focus groups

The outcome of the two previous focus groups was explained to the group. This was especially important for new staff who were unfamiliar with the CPD programme. Many nurses wanted more involvement with computers and more training if that was available. Some had received more training, but not had the opportunity to use those skills as there were only a few places to go to use a computer. Some said they used the primary school, but it was quite a walk, they had to plan it and it was not always convenient to go down there. Even if a friend had a computer, it was felt that it was not always right to ask to use it. One or two had computers in the office, in administration and in departments.

Emerging themes

The focus group on this occasion took place before the individual interviews with nurses, and some of the informants further developed their responses given in the group at personal interview. The themes are presented as domains and categories in table 5.24. These are education and training, future uses of computers, impact of technology and culture. The scope of the content of this focus group was greater than the first and second focus ones held on the third visit and will be discussed after the synthesis and incorporated into a componential analysis (Spradley, 1979).

Table 5.24: Summary of Focus Group 3 responses grouped in themes or domains and categories

Theme/ domain	Categories	Sub-categories	Sub-categories	Informant
Computer training and education	Computer skills Access to computers Professional updating Computer ownership	Ongoing training More laptops in wards and departments Flash drives/USB sticks Funding issues	Storage Increased personal ownership Journal articles/ module materials Financial problems	4, 26, 31, 33, 34, 21, 17
Future uses of computers	Research Teaching Learning Patient care	Using EBP Presentations Home study Assessments	Research information Family planning E-learning Data recording	26, 31, 34, 33
Impact of technology	Changes in clinical practice Communication Prescribing	Ebola/disease management Internet connectivity Drugs knowledge	Improved practice First-hand information Request drugs by email	31, 17, 33
Culture	National / international perspectives	Uganda/ western countries Airtime cost	News and the state of other countries – suffering	31, 34

Education and training

The initial question confirmed that new staff had received training, but were not using the skills yet. This was followed by enquiring about access to computers, which had become easier due to increased availability of laptops in several more wards and departments as affirmed by Informants 26, 4, 31, 33 and 34. This gave staff more opportunity to use and develop their skills. However, Informant 19 had still never used a computer, though Informant 34 had been entering data on the maternity ward for the last year. This was a new development. Informants 26 and

21 both emphasised that continual access was the key to keeping up their skills. The discussion moved on to how much computers were being used outside the workplace. There was some laughter: most of the group did not bother unless they had external personal access. Informants 17 and 31 talked about professional updating and accessing international news and current affairs. Following this, Informant 21 stimulated the group discussion further herself by asking the group:

> *…you have all been given flash drives (USB sticks) – What have you done with them?* (Informant 21)

This confirmed how the nurses in the group had used the information they were given which necessitated access to and utilisation of a computer. All nurses were given USB sticks at the outset of the CPD programme, so they could read articles and teaching materials from the programme as a means of revision and further study. Some responses confirmed that not all nurses had been able to look at them. Informant 36, who was a latecomer to the programme, asked what was on them.

> *…most of the modules and the topics…* (Informant 17)

> *…some articles to read. It was helpful…* (Informant 31)

The group were asked how they thought computers can help with their education and learning, and how they could gain greater access. It was suggested by Informant 21 that a lot of information can be stored on a computer. The discussion moved to funding issues which were preventing ownership, a common thread in many interviews and focus groups:

> *…funding is a problem and some people have financial problems…* (Informant 4)

The comment was linked to people who were incurring debt in order to purchase mobile phones, laptops or televisions. Informant 2 in interview also talked of personal debt.

Future uses of computers

The group were asked a question: if they owned or had personal access to a computer, what they would use it for? The responses were based on communication, research, learning, teaching, assessment and recording data. Some

were already using computers for these purposes, but saw the potential for further professional and teaching applications:

> *…Some research and getting information and if I want to send a message to someone. If I am doing a course or studying somewhere, it is easy for me to use computers. If I want to make a presentation I can use PowerPoint…* (Informant 26)

> *…in mental health I have a computer – putting in assessments, research information, evidence-based practice...* (Informant 31)

> *…like in maternity maybe when you want to teach – family planning – the women are not interested, we can change their mind (this is using information…* (Informant 34)

> *…at the moment the computer (on the ward) is only used for recording data…* (Informant 33)

Impact of technology

At this point in the focus group, it was appropriate to ask further questions about the ways in which computers and technology are changing the way nurses are working and impacting on their lives. The question was adapted slightly to make it more specific to the locality:

> What impact has technology had on you and the village? If you look back five or ten years before you had technology – computers, televisions or mobile phones – what has changed?

Changes in clinical practice – national and international perspectives

Most people agreed with the following comments, paraphrased from informants, about the impact of technology on communication and practice, and how it has transformed knowledge of diseases, treatments and prescribing. Some of the advantages of connecting with other countries and being able to see different ways of living and working in different parts of the world were discussed in the group. Clinical practice examples were given:

> *…for example, in the time when we had Ebola… a doctor was coming with a team to help manage Ebola… they came because we were communicating on the internet… getting first-hand information all the time… we get a case and they are aware immediately… the internet has improved communication between us and western countries, so when it is down it is very difficult…* (Informant 31)

…internet connectivity in the village is one of the major reasons for changes in clinical practice and when a doctor prescribes something… when the internet is not working, I become puzzled… when I want to know something, I want to look around it… really the internet is very, very important… (Informant 17)

…I want to talk about the internet, this internet has developed since I came here,… and we use the internet to send the reports, instead of sending transport to Kampala to get drugs, so it is quick. There was also another time when we were short of drugs; we needed to send an email to the offices and to Kampala… (Informant 33)

Culture

The previous responses led me to ask a spontaneous more probing question about using the internet and seeing the ways in which people live and work in other cultures outside Uganda, and how that has affected them.

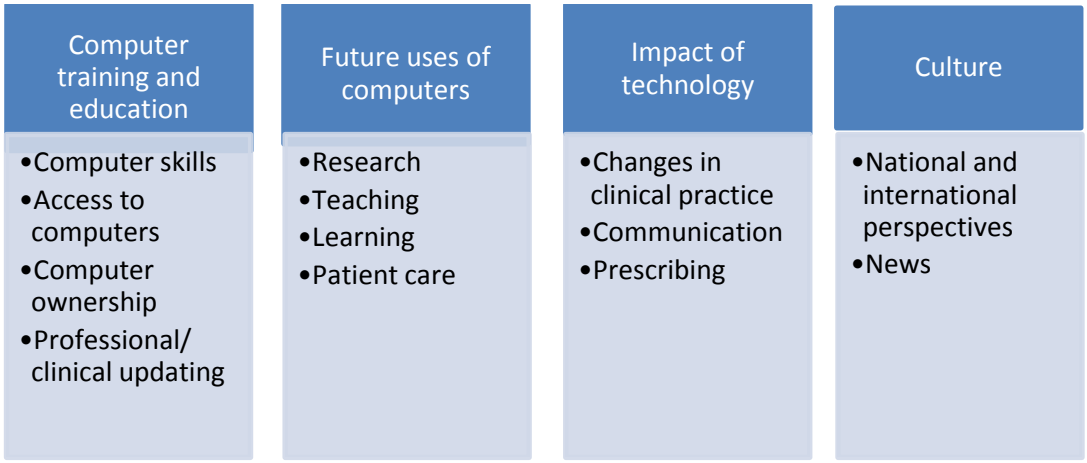
…as you know we live in a village, when you are on the internet you may know about something going on in Kampala. Airtime is very expensive outside of Uganda – shillings 1000 – 10000 is soon gone – it is up to you if you use it for 1 or up to 24 hours… (Informant 31)

Again, the cost is a controlling factor to spending time on the internet. This point was discussed in an interview with Informant 17 after the focus group. The discussion turned to international news and everyone agreed that they kept themselves updated. An interesting comment was made by Informant 34:

…it can also make you think you are the only ones in this country suffering, and you can see that other countries are suffering more – it changes your mind that we are not the only ones suffering… (Informant 34)

Finally, there was agreement that when they see what's going on in other places, education was the way forward.

Figure 5.8: Focus group 3 – Summary of domains and categories



Making a componential analysis of participant observation, informal conversations, interviews and focus groups

The end of the fourth visit offers the most appropriate time to conduct a componential analysis following the previous stages of the DRS (Spradley, 1979, 1980).

Additional interviews in the UK in 2013

Introduction

During 2013, two informants were interviewed during educational visits to the UK. Informants 28 and 38 visited respectively in July 2013 and November 2013 to attend graduation ceremonies. Both informants had moved from the research location to more senior posts in hospitals in other parts of Uganda. Each informant agreed to be interviewed as they had been included in participant observation or interviewed previously as part of this research. The duration of each interview was between 90 and 120 minutes, and each interview took place on university premises. The interviews provided valuable additional data, personal reflections, and an opportunity to undertake respondent validation on data previously collected. Each interview was analysed separately, and some common themes emerged which have been synthesised into one analysis. See table 5.25 containing domain and taxonomic analysis and synthesis below.

Table 5.25: Domain and taxonomic analysis, informants 28 and 38

Theme/ Domain	Categories	Sub-categories	Sub-categories
Computers and ICT development	Computer provision	More coms/laptops	SofN and library/wards
		Increased IT systems development	More reliable
	Access to computers	Charging for electricity	Meters in homes
		Televisions	Increased ownership
	Infrastructure/investment	Smart phones	
	Power availability	Internet cafes/Skype	Nearby towns
	Alternative technologies and increasing communication		
Barriers to ICT development	Costs	Personal	Electricity charges
		Organisation	LAN versus wireless
	Infrastructure	Type of connection	
		Lack of local investment (internet	
	Accessibility	cafe and bank closed)	
	Investment	Charity donations	(Not enough?)
		Sponsor	
	Sustainability		
Education and training	Skills training	Improving internet skills	Rich and varied experience
			Submitting assignments online
		Using Microsoft Office	
	Online learning	USB sticks, CD-ROMs	
		Drugs and treatments not available	
		A yearning to learn	

Theme/ Domain	Categories	Sub-categories	Sub-categories
	Searching for information	Exposure to computers Transport enables	
	Culture of learning		Attendance at university in Uganda
	Learning theories		
	Access to education		
Culture Impact of technology on culture and impact of culture on technology	Cultural clashes – beliefs and attitudes	The 'dot com' people versus post office people Morals Behaviour Dress Using Facebook Pornography Television Smart phones	Town versus rural life
	Exposure to different environments/ cultures		
	Social media Culture of communication		Student restrictions on Facebook Controlling factors
	Global issues	Access to transport and travel	Obtaining visas
	Colonial influences	Coming of the missionaries Government versus mission hospital system	
	Hospital culture		
Policies	Computer policy	In education	Dissemination through the population

Synthesis of themes from interviews with Informants 28 and 38

The interviews focused on the research location even though each informant had moved hospitals for a more senior position. Each informant provided some comparisons and contrasts between their new role and the original research location which was insightful into the culture of different hospitals, differences between rural and town life, and ICT developments. Each informant had gained graduate and postgraduate qualifications partly through distance learning and educational visits to the UK, which is significant due to their personal experience. The main domains or themes resulting from the interviews include computers and ICT development, barriers to ICT development, education and training, culture and policies. In addition, respondent validation was sought from each informant of key data generated from participant observation, focus groups and interviews from previous visits. Some data was validated during the interviews without specific prompts; however, some specific questions were asked, for example about cultural influences, to confirm and expand on specific points generated from previous data.

Computers and ICT development

The categories developed during the analysis included computer provision, access to computers, ICT infrastructure and investment, power availability, increasing communication and alternative technologies.

Computer provision, access and infrastructure

During the time of the CPD programme from 2009 to 2012, rapid change and development of the IT system in the research location was observed with more computers on site and increased access for more staff and students. Informant 38 summarised the development of ICT and computers on the research site that would not be possible without a sponsor. This was emphasised by both informants.

> *…in 2000 there were no computers, Informant 27 was maybe first… In 2008 some computers were bought in to the primary school… without that support (of the sponsor) there is no internet… sometimes there has been a delay in payment and then we are cut off… students now must do research as part of the programme so there is no way that students can be without it… you move on and you can't go back… we are waiting now for more internet cafes to come outside…* (Informant 38)

In her new location, Informant 28 had access to the internet, but it was sometimes less reliable as it was a LAN (Local Area Network) not wireless network, but there were more internet cafés available. In the research location, the only internet café had closed. Informant 28 reflected on her own experience of using the internet which in her words had been:

> *…a rich and varied experience… it has lots of advantages and disadvantages and short comings by way of location… initially I had to go to the internet café (in the new location)… sometimes you would have to pay… and for us it is expensive…* (Informant 28)

Informant 28 was able to compare the current and previous IT systems, and recognised that a major upgrade of the system in her current work location is required. There is growing demand for e-learning for student nurses that could only come to fruition with investment in the system. This also illustrates that the internet system was better developed in the research location at that time, notwithstanding the availability of hydroelectricity.

Communication and alternative technologies

The increased ownership of televisions. smart phones, computers and cars was described by Informant 38, and concurs with interview data obtained from Informants 17, 26, 28 and 31:

> *…smart phones are more available… mine is a smart phone and I can access the internet anywhere… this shows how technology has changed people's lifestyle… you had basic phones first and texts… how many years has it taken? Since 2009, since the project came, ownership of TVs, computers, phones, cars has increased, and life is much easier…* (Informant 38)

Television

Television ownership was raised in previous interviews and comments suggested that it was a negative thing. Both informants were asked about the increase in the number of televisions and their impact on people's views and lifestyle. Informant 38 commented that:

> *…now more people have brought televisions and they are watching international news, football, documentaries, it's educative, provides information and entertainment… people thought that when you watch*

> *television you waste time, films, football etc. but there are so many things to learn…* (Informant 38)

and Informant 28's opinion was sought:

> *…yes, many have TVs but there is something with TV when you have it… there are kind of extremes… people who are very serious with their morals have rejected televisions in their houses… if they have children they could block some of the channels… they are being careful – that is very cultural. Otherwise with all this that comes we welcome it… there are some small things where you find a group of people and say "Did you watch this?"…* (Informant 28)

In previous interviews, similar points were raised about being exposed via the internet and television to information about the world, worldwide news and western culture. I asked both informants whether seeing what is going on in other parts of the world changes people's perspectives on travel and life in general. Different responses were generated. Informant 38 commented on the 'knowledge gap' between the professionals and 'village people' who do not have electricity, so they cannot access television or the internet. I asked if he saw it as a growing problem.

> *…we are getting exposed and are accessing television – we get to know what the new improvements in health are. There are those who have never watched television, first they have no electricity or access, although (the research site) is a very small place, it is important. when people come in from the villages, it is their hope, I will get life in this place. It is geographically difficult to access… people come here having had treatments from herbalists or traditional healers. Examples are tooth extraction and millet extraction from beneath the skin. Community workers are also from local community. Culturally (the research site) is a community that has gone far ahead of others…* (Informant 38)

The implications are that some community workers still hold traditional beliefs that contrast with modern medicine. He also added that the hospital staff are highly rated, and more people are attracted to the hospital because of its developments. I had previously asked Informant 28 about hospital development and how this was attracting more people to the research site and more investment – more small shops were being established. The developments are viewed as positive, but will inevitably change the way of life. There is a fear that people will move away from the church.

Barriers to ICT development

I asked Informants 28 and 38 about barriers to the future development of internet technology (ICT). Again, the cost was cited as the biggest obstacle, as well as infrastructure. This was not only investment in the system, but the cost of personal use:

> *…At my place of work, we have the LAN but when I move out of the office I have to have a modem that I have to pay personally myself and now they are also increasing the charges… for example, it depends on how you subscribe. Given the kind of salaries income for some people – I can afford, I can try but if I was in (the research location) I could not afford a modem… this is because the salaries are lower… so when you look at the situation… I think that may be a hindering factor…* (Informant 28)

This comment about personal cost and affordability was also raised in December 2012 by Informants 4, 17, 26 and 31 as a prohibitive factor to personal ownership and to purchasing airtime. In addition, there are controlling factors that may be perceived as barriers or restraints to ICT development. These include the frequency of skills training and level of skills development, access to and availability of computers, and infrastructure development. However, they are also facilitators, and evidence demonstrated improvements in each area. Informant 38 expressed an opinion, and referred to *"…the 'Village' bubble…"* – that when eventually more people own their own computers, the ability to control usage becomes less:

> *…there is an element of control, but it's not possible, people will do what they want to do…* (Informant 38)

Education and training

Computer skills development

Informants 28 and 38 both had personal computer training at a university in Uganda and in the UK when undertaking nursing programmes, and both have personal laptops. When at the research location, further training had not been undertaken, but they could ask the technician or visitors to the hospital for help if needed. Much of their recent learning was through self-learning experiences using Microsoft packages. I outlined findings from the fourth visit to the research location and confirmed that people's skills are developing, there are more available

computers and increased access. For example, in the school of nursing, teaching was beginning to change through using the internet and more hospital staff had computers in the workplace.

Informant 28 commented about the developments that:

> *…it is a global thing… that is the direction… I think it is very positive…* (Informant 28)

A further question concerned student nurses and skills development. The question was initiated from a comment made by Informant 26 about Government computer policy in schools. All school children were being taught computer skills in schools that will eventually feed through to the school of nursing and into the workplace. Informant 28 commented:

> *…and they will find life much easier – for example, the nursing school and every school should equip students with computer skills – where I am in the hospital, I am most surprised they introduced a computer for nurses on the wards and some don't have the skills… then they come to (nursing) school… and they say "Is it possible for us to enrol to learn some computer skills in our free time?" so they can attend to the patient better on the ward. I thought that was really good…* (Informant 28)

I confirmed that what she was saying validated what had been said in the previous data and asked if what people say matched up to reality or not.

> *…I think what you are talking about is the reality, there is a yearning to learn. Sometimes I chase my people, I say "Now you get a laptop or computer and you use it for playing cards?" – yet people who know more about computers use it to even to generate income. We are still at that level where some people are using it for music, films and cards, games, but then I know people use for learning – I think if you come three years from now you will find a world of computers has changed…* (Informant 28)

The comments by Informant 28 were optimistic about the future expansion of computer use.

Online learning

I asked both informants what they thought were the advantages and disadvantages of online learning and different types of programmes available, such as full degrees

or smaller units of study such as MOOCs, and supporting materials on USB sticks or CD-ROMs. Informant 28 described her experience of online learning:

> *…you start to look at things in a different way… exposure… when I move out to a different environment I learn a lot… for example, being with this programme… ended up learning a lot of things that I would not have because of the computer… ultimately it all depends if you have good consistent internet – there are a lot of variables, it has to be funded, and weather dependent (such as in the research location)… at least if you have USBs and CD-ROMs you can access information without needing the internet… the real challenge is accessibility… learning online is very tricky – you can't do it when you are at work. I do my studies at home..."*

She added:

> *…I just wanted to say that this link is really helping us… the work is on the CD… you look and you have to go through a chapter… to go and enquire and try to acquire the skills, then you send it by email, you have to learn how to attach it – it has really helped us…* (Informant 28)

I asked about the suggestion that employers think that if you are studying via an online course you will not have to leave work. For example, instead of going away on a residential course to Kampala, as several of the senior nurses have done, they could stay in the workplace and study. Informants 17, 28 and 38 had studied for degrees partly online whilst remaining in the workplace, with some study time in the UK. In December 2012, Informant 17 said he would need more study time if he was going to take another online course in the future. Informant 28 supported online study, but acknowledged that it was also part of a problem that some staff are leaving. Informants 17 and 27, in December 2012, also talked about staff leaving because they are learning new skills and moving on:

> *…That's great, but it means that if you are working as well as studying, that's part of the problem… but I think it is the way to go because this link has really helped us so much… but unfortunately people moved… but for education it goes back to what you value and what you are getting, we have not got into the culture of valuing knowledge and skills even without a certificate…* (Informant 28)

Informant 28 went on to expand on online learning and its current utilisation. On several occasions, online learning had been commented on as challenging by other informants, and provides areas of contrast in different aspects of online learning

(Spradley, 1979). For example, online learning is talked about a lot, but how much it is really being used is questionable. In the research location, three members of staff who started the CPD programme were also undertaking online degrees with some study leave and face-to-face teaching in the UK. Online learning was encouraged for those participants of the CPD programme through searching for information online, supplemented offline by using USB sticks and CD-ROMs. Informant 28 commented that:

> *…it is really a difficult one – I think we are far from this kind of learning (online learning)… still more teacher centred… in a way the teachers work so hard… here in the UK, yes the teachers work hard, but the student does a good deal of work… it is discovery , you're really finding out things, it broadens you… then our other bit of study culture – you go to school, you get a diploma, you get a degree and you are making something of that, whether it is really helping someone know what they are doing or not… so you go away and get it anyway and come back… those are the challenges… and that discourages me from sending people to school… it happens sometimes when we send someone for clinical instruction… the instructors' course and the person comes back… we are eager to see and to put into place what they have done… how do we perceive education and with some kind of e-learning in place how do you put it into action – the application bit of it – and that is what I really enjoyed from here because all of my learning is what I am doing…* (Informant 28)

There are recognised problems with sending staff away on residential courses, sometimes for months or years, concerning the application of knowledge. With online learning combined with face-to-face methods of learning, Informant 28 was learning by doing.

Culture

One of the overarching observations I had made over the duration of the research was how people from different cultures embrace ICT and express different attitudes and fears towards how computer technology is utilised. The observations were also evidenced through individual interviews. This prompted me to ask contrasting questions (Spradley, 1979) designed to explore differences in cultural perceptions about technology, how technology has impacted on culture and how culture had impacted on technology, and attitudes towards how technology is used. I continued to refer to the PhD title, '…the cultural influences on the utilisation of internet

technology…', during the interviews to provide an explanation and context to the questions:

> From a cultural point of view in Uganda, how is technology influencing people's lives? Is there a cultural clash or difference (like traditional and modern medicine) between those who do and those who don't use computers or engage with ICT? Is there a negative response to the use of computers, for example?

The idea of cultural clash in the engagement with ICT was not recognised by Informant 28:

> *…I think not quite – it is taken like prestige to have computer knowledge so there isn't any direct cultural clash, but you hear statements like "the dot.com people" or "for us we are post office, for you, you are dot.com" – they relate this to the way the younger generation do things, they do this to name people who do things in a way that traditionally or culturally would not be accepted. This 'dot.com' generation... everything is very fast… you don't really think or take time. Otherwise there is no direct link… the internet is broadly accepted culturally in Uganda as a tool for learning and communication, but there is a fear that it will be misused for pornography etc…* (Informant 28)

To have computer knowledge is seen as prestigious, but there is a perceived difference described between those who use computers and those who don't. The differences also relate to the 'fast pace' of the younger generation. However, she went on to give examples of cultural involvement and a potential cultural clash in the use of social media, and in accessing pornography:

> *…now when we go to the internet… Facebook, YouTube and pornography sometimes, that is somewhere where we have some kind of cultural involvement… there are some parents who say they will not allow their children to access (the wrong things)… so as nurse educators… you see in the skills lab 'no Facebook' 'no pornography' – we feel there will be a culture clash – and yet we are teaching not only the professional, but also trying to promote the good cultures, discourage the bad cultures so we feel our students are protected… they might just get bombarded with everything… it needs to go slowly, you get used to it and it doesn't affect the way I do things now… otherwise on the whole I would say there is no cultural clash… we work on the computer and we love it as long as you know how to use it…* (Informant 28)

A similar question was asked of Informant 38, but more specifically related to the culture of the hospital in the research location, and whether the ICT systems in the

hospital clashed with people's cultural beliefs and attitudes towards the internet. Previously informants 2, 26, 28, 20 and 38 had raised the issue of people viewing pornography and the potential problems it may bring:

> *…It is true there are those who want to view pornography, but I don't think there are many. One example is in the school of nursing, we now have more laptops and nine computers as well as those from hospital management. They were all connected to the internet. One thing, some students would go straight to the computer and go on Facebook. At the beginning people are just exploring, it is a new thing… eventually we identified those who were misusing the computer, we put in place restrictions about Facebook and chatting with friends, the librarian would monitor them. Yes, people went onto Facebook, but personally I never saw anyone looking at pornography. I feel there were few, but the impression is everyone is doing it. …Culturally, watching pornography is not acceptable…* (Informant 38)

This response is totally unsurprising, but the issue had been raised on several occasions and seems to underlie some negative attitudes towards using the internet and its expansion.

Comparison of the new location and research site

I asked how different it is now living in the new location, rather than the research location. For example, has it better transport links and communication? How different is it culturally and do you find you have more freedom in some respects?

> ***…****I would not really take it as freedom, but because I loved where I was and liked the way I lived and worked, but for example when it comes to communication and transport it's much much easier because I can do my work and go home and jump on the bus anytime. I work even as late as 1 AM. I can go through to Kampala, do whatever I want and come back – it's that kind of ease doing things. If you want something you can get it…* (Informant 28*)*

The way of life in the rural setting was said to be more comfortable and unique because of the church, but more limited than the convenience of living in the town:

> *…in town you have to live the town way, you find them saying… you must have a car… there are lots of things you have to add, what kind of phone are you having, do you have internet on your phone… all of these things…* (Informant 28)

Informant 38 also compared government and mission hospitals, and the impact of computers, what people had to pay and the services provided. The first comment concurred with Informant 31 who expresses similar frustrations:

> *…frustration emerges when you know drugs are out there, but they cannot be accessed, or they are too expensive… because the computer has widened their knowledge base – it started to become a frustration…* (Informant 38)

I asked if they find that different types of treatment, for example surgical procedures or mental health treatments, are not available. Informant 38 compared the research location to the new hospital site and summarised that:

> *…(in the research location) for some operations the cost has increased. They have added money onto major operations, but core treatments are available… where I am working now in the hospital, they do minor surgery only as they don't have a surgeon. Major cases are referred to the university hospital… the government supplies drugs... but sometimes they are 'put off stock'. One wonders why the stock cannot be supplied. This sometimes happened in (the research site), but there was good control… Orders are checked by pharmacy and reports made…*
>
> *…People do not pay for drugs and treatments at the government hospitals, but in private, mission hospital etc. they do pay… sometimes people are asked to pay, but that is not official. There is some corruption…* (Informant 38)

There seems to be a big contrast between the Church of Uganda mission hospital and the government hospitals in Uganda. The problem of corruption was raised by Informant 37, but said to be being addressed. It was also raised generally in the first visit, in 2009, by Informant 3 in an historical context.

Culture, ICT and impact on people's lives

I asked about how the internet and technology are impacting on people's lives, asking informants to look at the bigger question, the bigger picture.

> *…in a nutshell it is having a very big impact on people's lives, a few years back you wouldn't find anything – cheap as it might be they say you can't access internet – it is everybody's goal… a very high percentage of people have mobile phones whether one can afford or not – they rent the phone or something and have a good one with internet and all other functions…*

The impact of culture on the way of life in Uganda, and other perspectives such as the impact of the missionaries on the process of technological development and way of life, were mostly seen positively, but sustainability was a worry:

> *…They (the missionaries) are protective on one hand… Historical development and the coming of the missionaries were seen to be like having a big cake – they wanted more of it. There has been a lot of force for good and development of the hospital which would not have been possible without it. However, sustainability now without the charitable donations would be very difficult...* (Informant 28)

Informant 38 also commented on the missionaries and agreed with the above statement when the impact of the missionaries was raised:

> *…the missionaries bought hope and money, setting up a hospital with the purpose of spreading Christianity, the friends of the hospital are the driving force, they send supplies and equipment etc. from England… the hospital is now one of the top hospitals in Uganda, if not the first… the hospital received a presidential award… for good performance management in the whole country (in 2010), this was after the project started. They did a country wide survey and the hospital was singled out…* (Informant 38)

The comments from Informants 28 and 38 about the missionaries and their impact on technological development demonstrate that access to the internet is a positive influence on health and healthcare. This has been channelled through more staff and nursing students having access to computers and the internet, and development of teaching and learning strategies to include CPD for trained nursing staff and education provision, resulting in increased knowledge about healthcare, drugs and treatments. Inevitably, increased knowledge has led staff to challenge the status quo and to move on to other jobs in Uganda (Informants 23, 27, 37). Increased access to the internet, whether through computers or mobile phones, has also exposed staff to social media and national and international affairs, which has been viewed negatively by some. This is because it is considered to be timewasting (Informant 17) and used for immoral purposes such as accessing pornography (Informants 26, 28, 38). When informants have been asked about this, Informant 38 maintained there was very little evidence that this is happening. Using social media and Facebook is another area of contention.

Social media

Social media and Facebook were raised many times in interviews and opinions differed about its use. Informant 28 commented:

> *…now the government is saying – Facebook, Facebook, Facebook – some politicians and dignitaries have said "Don't rubbish Facebook, it is very important, there is a lot of good social networking going on and lots of things you can learn from there" – so there is robust support from government…* (Informant 28)

Other informants reported mixed views of Facebook (Informants 2, 17), noting that people are wasting time or using it for corrupt purposes. Informant 7 commented that students are becoming more skilled at using social networking sites. Informant 38 remarked about students using Facebook and chatting online when they should have been searching for information. The misuses of using social media have been monitored in the school of nursing:

> *…One thing, some students would go straight to the computer and go on Facebook. At the beginning people are just exploring, it is a new thing… eventually we identified those who were misusing the computer, we put in place restrictions about Facebook and chatting with friends, the librarian would monitor them…* (Informant 38)

When people start to gain access to the internet, they also start to become exposed to social media. Several informants have expressed an opinion or concern about its use. In the joint interview with Informants 20 and 38 in the fourth visit, computer usage and engagement with social media were said to impact on traditional values such as how the younger generation dress or behave.

Computer policy in schools

I outlined the content of the data obtained in December 2012 about computer policy in schools. This was raised by Informant 26, along with the implication that this would eventually disseminate through the population and students will come equipped with computer skills into the school of nursing.

The synthesis of data from interviews with Informants 28 and 38 served to provide respondent validation by exploring some of the data gathered through participant observation, previous interviews and focus groups. Their responses are further

analysed into a componential analysis resulting from identifying contrasts in the data.

Making a componential analysis

The final two interviews provided me with an opportunity to ask questions to help verify some of the areas of the data gathered throughout the research, as well as asking contrasting questions to make a final componential analysis (Spradley, 1979). This involves finding out additional meaning from the gathered data. It also enables similar and different perceptions in the breadth of cultural meaning to be explored. When asking questions about culture, the responses implied different perceptions and areas of contrast.

For example, television can be perceived as a positive or negative development. Many people welcome TV as they have access, for example, to international news, football and documentaries, and regard it as a learning medium. It is also a source of discussion about shared viewing. Others, who are 'serious with their morals' have rejected TV: '…if they have children they could block some of the channels…this is very cultural'. It is also considered by some as being a waste of time.

Other areas of contrast were greater exposure to the outside world though television and improvements in health care, changes to the way of life because of more investment and hospital developments, and a fear that people would move away from the church. A further contrast was a knowledge gap described between the professionals and the 'village people' who do not have electricity or access to the internet or TV. They may receive traditional medicine first before coming into the hospital. Culturally the research site was described as being 'far ahead of others'.

The use of computers is discussed in terms of education and skills for the workplace, yet their many other uses are highlighted in the research, such as for playing games or building business and generating income.

Online learning is also viewed as an aid to learning in the classroom and searching for information to complement studies. Alternatively, it is viewed as a formal part of learning as all or part of a designated programme of learning which would help to put theory into practice. Online learning is also contrasted with the traditional study culture of learning by going away to residential 'nursing' school, getting a diploma or degree and coming back to the hospital to use new skills. If e-learning is part of the course, it would be easier to put learning into action in the workplace.

Cultural perceptions are explored with the informants concerning the impact of technology on culture or alternatively the impact of culture on technology, and whether there are clashes of culture: for example, between those who engage with ICT and those who don't. However, it is considered prestigious to have computer knowledge, but differences are also perceived. One comment contrasted those who engage with ICT as the 'dotcom people', attributed to the younger generation, and those who don't as the 'post office people'.

Potential cultural clashes were identified in the use of social media and accessing pornography. Regulating use of computers was not only the role of parents, but also part of the role of the school of nursing. Teaching and learning are promoted as the 'good' culture and 'bad' culture is discouraged to protect the students.

The two informants who moved away from the research location are able to contrast the way of life between the rural research location and living and working in a busy town. In the town transport and communication is easier, but the uniqueness of the research location because of the church is greatly missed. Mission and government hospitals are also contrasted using examples of the cost of drugs and treatments; this was less in government hospitals, but the technological development appeared to be better developed in the research location at the time of the research according to the informants.

Part of the process of undertaking a componential analysis, albeit representational rather than fully comprehensive, is to identify dimensions of contrast from the interviews. The following table represents the dimensions of contrast discovered in the final two interviews.

Table 5.26: Dimensions of contrast with examples of alternative views

Domains	Dimensions of contrast	
Television	Accept – for learning, advances in healthcare, documentaries, global exposure, international news, football	Reject – moral issues, block channels if deemed not suitable, time wasting. 'Very cultural'
Knowledge gap	Professionals, ICT, investment, hospital & healthcare developments. 'Far ahead of others'	Village people. No electricity or internet. Traditional medicine
Computer usage	Education & workplace skills	Playing games, business, income
Online learning/ Study culture	Complementary to learning in the classroom, internet searches. Full/part time online courses. Theory to practice application CPD	Going away to study for 'nursing' diploma, degree. None or little online learning. All theory. More difficulty applying theory to practice
ICT engagement	The 'dot.com' people. The younger generation. Most engage with ICT	The 'post office' people. Do not engage with ICT
Culture/cultural clashes	'Good' culture Learning, working etc.	'Bad' culture, social media, pornography
Culture/way of life	Rural living, church and community, isolation	Town living, transport and communication
Hospitals	Mission hospital. Cost of drugs and treatment higher, technology advanced in research location	Government hospital. Costs of drugs and treatment lower. Technology variable – from examples given

Discovering cultural themes

From all data analysed, culture is explicitly described in various ways by informants, but some examples are tacitly observed through participant observation. Culture is examined in increasing detail throughout the data analysis and further summarised and synthesised in this section. Spradley (1979, p.185) describes using an 'inventory approach' to provide an overview of the culture, a technique which is provided here. The cultural themes that emerge from various domains represent different understanding of cultural meaning and, in this research, reflect what informants believe about different types of culture. Spradley (1979, p.186) also describes

cultural themes as 'larger units of thought' which may include related themes or subthemes. Spradley (1979, 1980, pp.152-153) identified six universal themes (see Chapter four) that he advised can be used in the initial scrutiny of data to discover cultural themes, and they are considered in the final summary.

Many types of culture were described by informants and illustrated by listing in cultural domains and categories. Spradley (1979) suggests that this approach allows for differences in informant descriptions or beliefs to be illustrated through componential analysis. Examples of dimensions of contrast, and alternative views, are presented in table 5.26 such as 'good' and 'bad' cultures. These terms were described by informants who explained the different cultural positions and what others meant by these terms. The terms also reflected 'clashes in culture' where perceived traditional values were challenged by perceived ICT culture.

Cultural themes are summarised from the data below as described by informants in the study. Some of the themes are similar and grouped together.

Table 5.27: Cultural themes extracted from the data

Cultural themes/ Domains	**Summary of informants' perceptions of culture summarised into cultural themes.**
National culture	Impact of technology on culture – leads to cultural change Impact of culture on technology – lack of knowledge and experience may hold back development. Cultural clashes – beliefs and attitudes. 'Dot.com v. post office': those who do or don't engage with technology
Local culture	Advantages and disadvantages to society, social impact on the local community. Fears about computers, cost/debt. Computers seen as 'magical'. Management needs to 'bless' the technology. Hospital is a 'mini' state. A micro-culture. Self-contained: electricity, water etc. Live and work onsite.
Alternative cultures	Exposure to alternative cultures through internet, BBC Online, Reuters, Sky, current affairs programmes. Social media, Facebook.
ICT culture	Impact on the population. Global and international perspectives, political awareness, the 'global village'. New

Cultural themes/ Domains	Summary of informants' perceptions of culture summarised into cultural themes.
	ways to support people through research and management of disease outbreaks e.g. Ebola.
Service culture	Influence on attitude and thinking about how service is offered. Moving from paper based to electronic system.
Culture of care provision	Ugandan – Professionals. Less hands-on patient care, more personal care and feeding provided by relatives.
Reading culture Oral v. ICT	Old culture is reading books and writing and recording in note books. Moving to online reading, rather than books. Impact on CPD and access via ICT
Communication culture	Telephone, radio, churches and mosques were described as ways of communicating by 'word of mouth' (or by radio). Traditional – not ICT.
Culture of learning	Taught in classrooms, course work and exams. Traditional – but moving to ICT based learning, e-learning and ICT supported CPD
Culture and lifestyle	See and copy other cultures, ICT impacting on traditional ways of life. Dress, attitudes, expectations, desire to travel

Analysis of the cultural themes

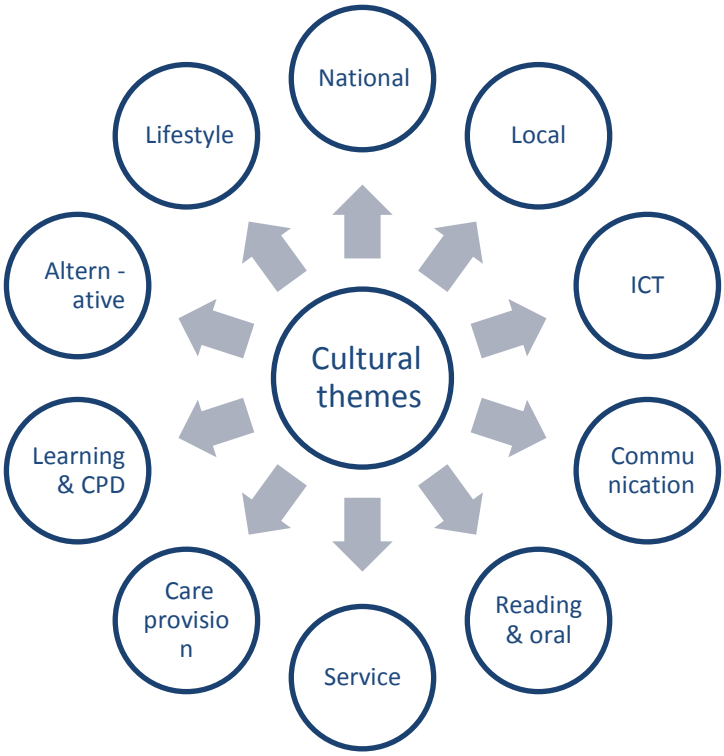
Spradley (1979) describes six universal cultural themes that are applied to this research. In addition, the application of cultural themes provides further areas of contrast and componential analysis, and is briefly discussed as follows:

Social conflict as suggested can describe the opposing views possessed by different groups of people, for example, those who have been exposed to ICT and those with no experience of it, who may have developed positive or negative perceptions resulting in social conflict. Cultural contradictions are described as the 'official image' and the 'insider views' (Spradley, 1979, p.200) reflecting different cultural values. The introduction of ICT at the research location is the official policy, clearly demonstrated through development and upgrading ICT systems and computer skills training. It is valued for education, including CPD and work practices. Some oppose individual use of computers for social media, gaming and corrupt purposes. Others are 'fearful' of them, considering computers as 'time wasting' or 'magical'; Informal techniques of social control are demonstrated through the introduction of policies

to restrict the use of computers in the school of nursing at the research location to educational purposes only, and explicitly not to be used for social media; Acquiring and maintaining status has been linked to computer ownership by informants, especially when ownership is relatively low. This puts individuals who are 'owners' in a position of perceived importance with access to wider information and knowledge. Solving problems through culture can be illustrated in this research by evidence of national and local implementation of ICT infrastructure and development of computer utilisation skills in the research location. This is reflected in policies and economic growth which in turn will impact on the health and prosperity of the population through a social and cultural shift as ICT becomes more acceptable.

The data analysis illustrates that informants perceive and describe culture from different perspectives. This is reflected in some part by different educational and training experiences and exposure to ICT. This is summarised in figure 5.9 below.

Figure 5.9: A model depicting cultural themes synthesised from the data analysis



Conclusion

Spradley's DRS (1979, 1980) provides the framework and theoretical basis for the methodology to enable a detailed data analysis and synthesis of participant observation, conversations, interviews and focus groups data through identification of folk terms, the construction of domains and categories, taxonomic and componential analysis. A final synthesis of the data and cultural themes was completed after all data had been analysed.

The stages of Spradley's DRS are logical to apply and allow a combined approach to data collection, analysis and synthesis for participant observation, interview and focus group data. The chapter is written in a chronological sequence following the DRS through to discovering cultural themes and writing the ethnography. It is intended to convey a research journey and at the same time provide an insight into the individual cultural perceptions and cultural influences experienced by informants in developing computer utilisation skills and continuing professional development.

The data has culminated in the identification of ten cultural themes.

Chapter six discusses the findings from the data and applies the literature review, and policy, cultural and theoretical analysis to them.

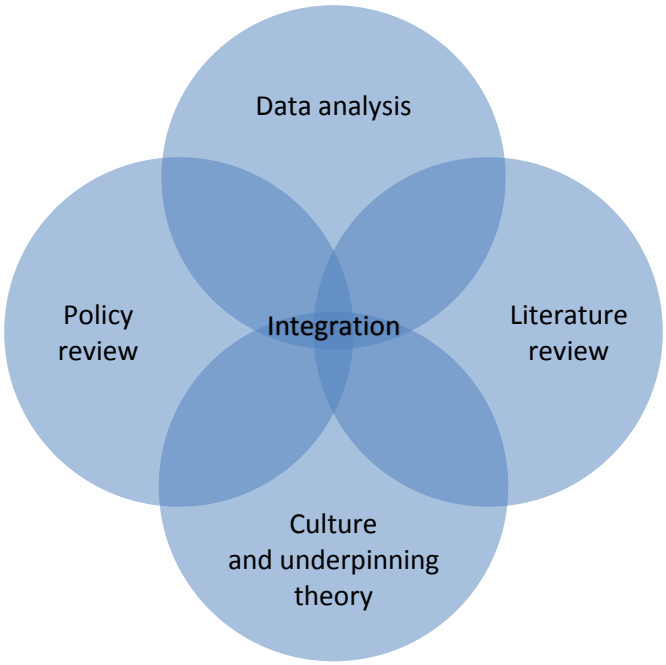
Chapter 6: Discussion

Introduction and structure of the chapter

Introduction

The chapter discusses how the overarching research aims and research questions were explored in the thesis, and how the research findings are justified and contribute to new knowledge. The following figure (6.1) represents the integration of data, literature, policy, culture and underpinning theory.

Figure 6.1: The integration between the data, literature, policy, culture and underpinning theory



The discussion chapter is subdivided into sections that answer each research question drawing on data, literature, policy, culture and underpinning theories. Ten themes were identified in the literature review that were later integrated with the final six domains and cultural themes generated from the data analysis chapter, to form the structure of the discussion chapter summarised in table 6.1.

Table 6.1: Summary of themes and domains integrated to form discussion chapter themes and content in relation to the research questions

<table>
<tr><th>Chapter 2
Literature review themes</th><th>Chapter 6
Integrated discussion themes and research questions</th></tr>
<tr><td rowspan="3">• Computers and ICT development
• Computer literacy
• E-learning and online usage
• Role of libraries
• Knowledge, attitudes and perceptions
• Barriers
• Benefits
• Policy
• Culture
• Theory</td><td rowspan="3">What are the facilitators and barriers to learning and using computer technology?
• Computers, ICT development and benefits
• Barriers and facilitators to ICT development (including knowledge, attitudes and perceptions)
• Policy, culture, theory
What are the nurses' views and experiences of using computer technology?
• Education/training/CPD (including computer literacy, utilisation skills, e-learning, online usage, role of libraries)
• Policy, culture, theory
Is the professional development of nurses and how they utilise computer technology influenced by policy and culture?
• Policy, culture, theories integrated with above sections
• Summary
• Strengths and limitations of the study
• Reflexivity
• Conclusion and answering the questions</td></tr>
<tr><td>Chapter 5
Data analysis domains</td></tr>
<tr><td>• Computers and ICT development
• Barriers to ICT development
• Education/training/CPD
• Policy
• Culture
• Theory</td></tr>
</table>

Research questions

The overarching research questions are encapsulated in the title of the thesis which is to conduct '**an ethnographic study that explores how culture and policy influence the continuing professional development of nurses and their utilisation of computer technology**'.

The specific research questions are:

1. What are the facilitators and barriers to learning and using computer technology?

2. What are the nurses' views and experiences of using computer technology?
3. Is the professional development of nurses and how they utilise computer technology influenced by policy and culture?

The following sections discuss each of the three research questions, how the data is supported by existing knowledge, policies, theories and the cultural context, and the extent to which this thesis answers the research questions. There is some overlap between sections where informants differ in their responses and where there is contrasting data, elicited through componential analysis (Spradley, 1979, 1980).

1. What are the facilitators and barriers to learning and using computer technology?

The facilitators and barriers to learning and using computer technology, including policy, culture and underpinning theories, are divided into subsections in the literature review and data analysis, but are synthesised here to allow for an integrated discussion.

Computers, ICT developments and benefits; Power supply and infrastructure development

The research location has demonstrated the importance of national ICT infrastructure development and the harnessing of natural resources; these provided the foundation for internet services and opened up new possibilities for the hospital and its staff. This is supported by the data and through national policies, the literature and theories.

A power supply is fundamental to establishing and maintaining the internet (Frehywot *et al.*, 2013). The existence of a natural local water supply was instrumental in the establishment of the faith-based hospital, and in the recent hydroelectricity scheme that enabled the successful development of an electricity supply and the internet there. Without these fundamental developments, nurses would not be able to access up-to-date knowledge, information and professional updating through the internet and online learning, or participate fully in CPD. It also helps to draw new nurses and doctors to work in the hospital from other parts of

Uganda and internationally from other parts of the world due to the hospital's growing reputation, as expressed in interviews. Infrastructure and national development of the cable and wireless networks is ongoing, leading to more reliable signal strength and improved access. However, it can still be impacted by interruption to the signal.

Nurses at the research location sometimes experience limitations of the internet due to narrow bandwidth, slow speed affecting downloading and access to educational materials. However, this improved over the period of the research and delivery of the CPD programme.

The need for policy development that drives technological change is identified in the literature review. Ejiaku (2014) stressed the importance of policy frameworks to guide and develop ICT infrastructure, investment and adoption. Acharya (2007) reviewed policy making in developing countries as essential to effect technological change, especially in public health where the introduction of hand-held diagnostic devices can reduce healthcare costs. Research by Omono *et al.* (2006) set in Uganda identified the value of an early national ICT policy in determining infrastructure development. In Uganda, this was followed up by a National Technology Policy (MICT, 2012), demonstrating government strategies are in place and that the implementation of ICT infrastructure is ongoing.

In addition, Bada *et al.* (2016) developed a conceptual framework containing six key factors that should be present for successful ICT based service delivery in hospitals in Uganda (see figure 2.2). These are an electricity supply, network connectivity, mobile communications, online resource access, computer literacy and positive attitudes towards ICT usage. The research location demonstrates a correlation with these factors, all of which are discussed in this chapter.

Access to computers and ICT utilisation

In the research location during the period of data collection (2009–2013), there were observable and corroborated developments in computer provision illustrated in the data, including improved availability of laptops, an increase in individual ownership, and upgrading of the ICT systems with consequent impact on the quality

of the internet server and, for example, more reliable downloading of clinical data and CPD materials. Nurses also had training in computer utilisation skills from the IT technician in the hospital location. There were, however, a few nurses who had no experience or training at all, despite it being available. Other data indicated that although some staff had their own laptops, they still wanted greater and more reliable access to the internet for professional development. Some staff purchased modems at considerable personal cost, which became prohibitive in the long term when paying a regular monthly subscription. The data indicated that nurses who had greater access to computers had a higher level of skills development. Informants who were undertaking degree studies, those who had previous computer skills training in another institution, and those who had additional training to use the new hospital system contributed to a growing cohort of nurses with well-developed computer skills. This scenario is supported by the literature.

Lupianez *et al.* (2011) investigated nurses' utilisation of ICT and the internet. Although this research was conducted in Spain, it holds resonance with the research location because it identifies different nurse profiles. Two groups of nurses were identified: those who value ICT more (integrated nurses) and were more likely to use the internet for research and for enhancing clinical practice, and those who value it less (non-integrated nurses) who placed less emphasis on ICT. Some nurses expressed barriers to its use including poor access to computers, connection to the internet, lack of time and lack of training. In the research location, nurses expressed similar barriers and demonstrated the existence of similar types of nurse: those who embraced computer technology, and those who used it because it was required in the workplace or not at all.

When considering the ICT adoption theories of Rogers *et al.* (2003), 'early adopters' appear to reflect the integrated nurse scenario and those nurses in the research location with more developed computer utilisation skills who use the internet for education and developing and updating clinical practice. 'Later adopters' are those who use it in the workplace, and 'laggards' are those who do not use it at all.

ICT developments and alternative technologies

In addition to the introduction of computers and laptops in the workplace and for educational purposes, ICT developments were also explored. Teleconferencing, mobile phones, access to TVs and internet cafes were alternative technologies available in the research location, and were raised in the data collection both spontaneously and by people seeking clarification about their access, ownership and adoption. During the study, the number of televisions has grown rapidly enabling access to national and international news. An informant confirmed, in 2012, that most houses in the village had televisions. Again, televisions were only possible due to electricity and wireless signals being available. Developments in technology internationally, including sub-Saharan Africa and Uganda, are prominent in the literature.

Teleconferencing was introduced at the hospital in the research location as confirmed at the 2012 field visit, although it is still in its infancy. One nurse informant was already communicating internationally via teleconferencing concerning infection, prevention and control; developing professionally and contributing to the hospital through clinical updating. ICT developments have paved the way for teleconferencing and telemedicine in sub-Saharan Africa. A study by Omona *et al.* (2006) explored the application of ICT in Ugandan hospitals and generally found an underdevelopment of ICT infrastructure and a high level of computer illiteracy; however, the diffusion of ICT was reported to be developing rapidly, especially in the mobile phone sector and the development of telemedicine, and recent statistics confirm this (IWS, 2017). According to Rogers' (2003) theory, this nurse could be classified as an 'early adopter' in the research location.

The research by Isabalija *et al.* (2011) was specifically targeted at policy makers in Uganda who were developing national IT policies to promote telemedicine. Recommendations were made to develop knowledge, training and computer equipment to increase the likelihood of technology adoption. Abbott *et al.* (2008) also discussed the potential for telenursing in the delivery of nursing care, health activities and CPD in Africa. They suggested that growing mobile phone technology

will facilitate these developments. Indeed, considering the dates of Orem's (2006), Abbot's (2008) and Isabalija's (2011) research, the hospital location and the establishment of teleconferencing are advanced in the context of Uganda at the time of the research.

Development of the mobile phone network in Uganda is ongoing with an increase in mobile phone ownership and more smart phones with internet access in use. In 2012, an informant confirmed that most of the staff in the research location had mobile phones and there was an observed increase in mobile phone ownership. Mobile phones are also widely available in the local villages and are becoming a main means of communication according to another informant. In 2016, mobile phone ownership in Uganda was on average 55% of the population with a greater percentage with access to a mobile phone, but this was less in rural areas and less than 20% of these were smart phones (World Bank, 2018). An ongoing concern in the research location was that purchasing mobile phones, laptops and televisions was contributing to personal debt. Given the reported difficulties for staff accessing computer terminals in the research location for private use, smart phones are a viable alternative to overcome restrictions on internet access. This is supported by a study about technology enhanced learning undertaken by Maria *et al.* (2016), who concluded that there is a more realistic potential for mobile phone ownership for students as technology advances. Ten years on from Abbot's research in 2008, there has been a rapid increase in mobile phone access and ownership by individuals, and in applications in e-health: mobile phones are increasingly being used by community health workers for e-health services provision requiring specific utilisation skills.

An internet café was independently established near the research location in the village, and was initially welcomed as it provided a service to the local population and an option for staff. Others provided a contrasting view and were not supportive, as they saw it as a diversion from the church and from what was already provided by the hospital. It closed after approximately one year due to limited resources, underuse and cost which was said to be off-putting by an informant. There is evidence from informants that internet cafés elsewhere have

provided a valuable service to nurses undertaking further study where there was no alternative but to use them, but this involved paying for the service. Bukachi *et al.* (2009) and Ajuwon *et al.* (2008) provide evidence of use of internet cafés when alternatives are limited or not available. Inevitably, in the research location with the increasing availability of hospital and school of nursing computer facilities, personal ownership of laptops and the growth of smart phones, the need for internet cafés has diminished.

Barriers to and facilitation of ICT development

At the research location, the data indicates that some of the changes and benefits are both barriers and facilitators to ICT development. The provision of the internet and ongoing improvements in the hospital ICT infrastructure are clearly benefits. However, the unavailability of the internet at times due to infrastructure issues, bad weather and signal failure is also considered a barrier to development. These slow down the speed of the internet and the hospital can go for long periods with no service, impacting on individual access. This causes frustration and the development of negative attitudes towards the ICT provision as illustrated in some of the data. Similarly, although there is a reported lack of accessibility, data shows there are an increasing number of computers on the hospital site and school of nursing, and a gradual increase in personal ownership. Cost and affordability remain an individual problem as well as an organisational one, with dependence on a benefactor to pay an internet network subscription at the time of the research. The data indicates that the level of internet service at organisational level is determined by the amount of funding and could be improved if more funding were forthcoming.

There is also an issue with the initial cost, computer provision, and the repair and disposal of old and obsolete equipment. Because computers are often donated from various organisations, there is no warranty or repair service. This problem is addressed in an electronic waste (e-waste) management policy produced by the Ugandan Ministry of ICT (MICT, 2012), to be rolled out for specific action by all government sectors including health services.

These scenarios provide an example of how Rogers' (2003) diffusion of innovation theory can be applied to the research location and the process of adoption. Rogers' (2003) theory shows that social systems and the initial financial cost of an innovation play a major role in the rate of adoption at organisational level. Similarly, funding for ongoing maintenance and upgrading is required as technology advances. This is illustrated at the research location, as the level of service is dependent on how much the benefactor is prepared to pay. Similarly, how much an individual is prepared to pay for a modem, a monthly subscription for access to the internet, or purchase of a mobile phone or computer/laptop will also determine the rate of adoption. However, as an innovation becomes more established the cost is likely to reduce, making it more affordable (Ejiaku, 2014) and leading to a critical mass of adopters or improved organisational facilities (Rogers, 2003). Rogers' first three stages of adoption are referred to as 'culture-bound', with different pressures to adopt depending on if the country reflects an individualist or collectivist culture. The dimensions of national culture featured in the Hofstede *et al*. (2010) model also refer to individualist and collectivist cultures that reflect western or developing country cultural characteristics, and illustrate how the theories of Rogers and Hofstede *et al.* have common elements to ICT adoption.

Kaba *et al.* (2013) describe Hofstede *et al.*'s (2010) five dimensions of national culture as aiming to analyse the influence of culture on the adoption of ICT by differentiating between the characteristics of western and developing countries. Nationally, Uganda reflects the characteristics of a developing country, although the research location is influenced by a unique blend of Ugandan and western culture through the impact of western missionaries, volunteers and project workers working permanently or for short periods at the location since the 1950s. The application of Hofstede *et al.*'s (2010) theory postulates how ICT developments at the research location are more advanced and the pace of change is greater than in other parts of Uganda due to western influence. However, Hofstede *et al.* (2010) refers to the complexity and unpredictability of cultural influence.

The analysis of computer diffusion, acceptance and adoption theories suggests that attitudes play an important part in the implementation process. However, the

number of computer users in the research location is increasing and, according to Rogers' theory, they are forming a 'critical mass' of adopters (Rogers, 2003), indicating that more positive attitudes prevail.

Attitudes

Interview data provides contrasting evidence of staff attitudes towards computers and utilisation at the research location. Negative opinions were expressed when nurses experienced a growing gap between exposure and initial computer training and being unable to access computers to practise their skills. Others with limited exposure and limited access to computers thought there should be more availability on the hospital site, despite facilities being provided in the primary school. Those staff declared that it was inconvenient to use them. This did not dissuade all staff: some were motivated to access knowledge to enhance clinical practice and improve patient care, so even though they had limited access, they actively looked for opportunities to develop their skills.

Positive attitudes towards technology are also a feature of Sukums *et al.*'s (2014) research carried out in Ghana and Tanzania. The results concluded that despite limited facilities and lack of access to computers, healthcare workers maintained positive attitudes with a desire to learn computer skills. Research also suggests that sub-Saharan Africa is behind the developed world by more than ten years in ICT growth, but positive attitudes of health workers in the study were encouraging for future developments (Sukums *et al.*, 2014). In addition, Topkaya *et al.*'s (2014) research demonstrated a positive correlation between nurses' computer literacy skills and attitudes towards use of computers in healthcare. Training in computer skills was vital for creating a positive attitude and contributed to lifelong learning. Interestingly, a study by Ali *et al.* (2013) in Uganda concluded that the level of teachers' ICT competence, experience and level of education impacted on students' learning and ICT integration.

In the research location, both positive and negative attitudes are expressed by informants. Frequently expressed and observed factors that influence behaviour and engagement with ICT are cultural reasons and fear of technology. One

informant suggested that some of the staff were "*timid and naïve with computers… some of them get worried… there is another group that is really keen"*, demonstrating contrasting views. Another informant reported that in conversation it was suggested to him that age and capability were factors in learning new skills. The frequency of skills training, level of skills development and access to computers are also seen as controlling factors by some informants. These points are reflective of Davies's *et al.* (1989) technological acceptance model (TAM) that suggests whether technology is accepted or not depends on its perceived usefulness or perceived ease of use. Attitude is also a factor, along with individual intention to use the technology. The theory of planned behaviour (TPB) (Anisman, 2016) suggests a further factor linked to behaviour intention is a 'perceived or actual element of control' such as cultural factors that may moderate behaviour.

However, the data analysis from the research location also indicates an enthusiasm for ICT development and a desire to access clinical information to enhance practice, to obtain global perspectives on health care to inform practice, and to have access to international news and current affairs. The thirst for knowledge has widened horizons, both virtually and physically, and has social and cultural implications for professional nursing as well as lifestyle. The wide range of computer utilisation skills displayed by informants and other health care staff reflect individual stages of adoption of technology as described by Rogers *et al.* (2003) and Davies *et al.* (1989), whose theories explain how individuals' attitudes and perceptions influence decision making about technology adoption. In addition, Hofstede *et al.'s* (2010) research explores the impact of culture on technological advancement in western and developing countries, and helps to understand the pace of change experienced within organisations and its effects on individual adoption and acceptance.

Staff retention

Nursing staff leaving the hospital, and research location, are seen from two perspectives. Some staff were leaving due to new opportunities in other health care facilities or universities in Uganda. They became 'marketable' with new skills in computer utilisation as well as benefiting from a UK university led CPD programme. The literature reviewed indicated that reasons for nurses participating in lifelong

learning, developing computer utilisation skills and attending CPD events were to secure promotion as well as to enhance their skills (Muliira *et al.*, 2012). On the other hand, data from senior managers at the research location indicated a concern that staff retention is a problem. Staff leaving the hospital depleted the workforce skill pool, so new staff had to be trained up, for example, where computer utilisation skills are necessary in the workplace. Research by Yagos *et al.* (2017), Frehywot *et al.* (2013), Chio (2012) and Mugisha (2009) demonstrated that ICT increases access to education and learning ICT skills. In addition, offering CPD programmes to healthcare workers, including doctors and nurses, increased staff motivation and the retention of all healthcare workers in rural locations.

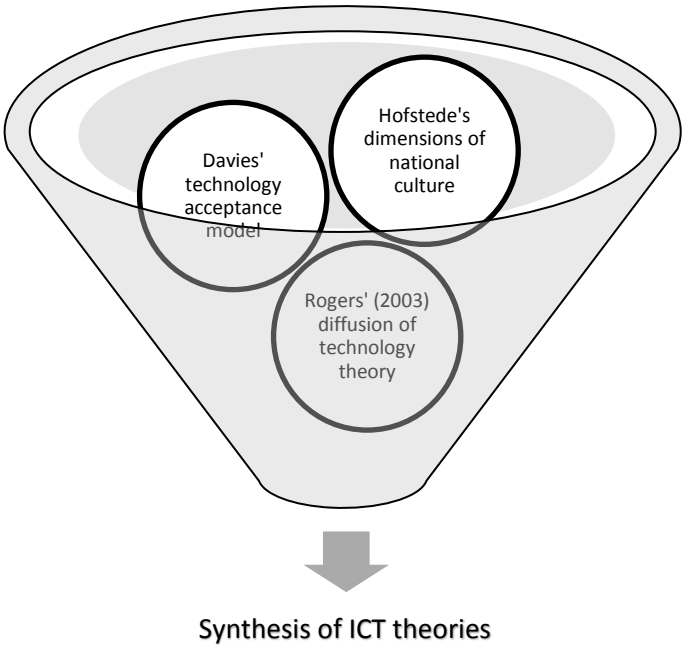
Section summary: Influence of policy, culture and theory on ICT diffusion and adoption

There are acknowledgements in the literature that national culture is an influencing factor in the successful implementation of ICT. Hofstede *et al.*'s (2010) dimensions of national culture explain that sub-Saharan Africa, which includes Uganda, exhibits slow economic growth accounting for delayed uptake of ICT adoption. Albirini (2006) and Kaba *et al.* (2013) likewise conclude that national culture and cultural and social differences impact on attitudes towards ICT adoption. In common with their findings, the research location generated data demonstrating that technical, economic, cultural and social factors, and attitudes were influential in ICT adoption. In addition, research considers that there is not enough attention paid to cultural and language differences in developing countries, and they are key factors in ICT acceptance when introducing new technology (Albirini, 2006; Ejiaku, 2014; Kaba *et al.*, 2013).

A growing number of research studies looked at the impact of technology in developing countries and the factors that influence acceptance, diffusion and adoption. Albirini (2006) considers Rogers' diffusion of technology theory (Rogers, 2003), and postulates that existing culture and social norms within a country or organisation may create barriers to change and prevent diffusion of innovation. He states that although there may be national acceptance of technology, and policy development and recommendations for implementation of ICT across developing

countries, there may still be resistance to adoption at organisational, local and individual levels.

Figure 6.2: Synthesis of ICT theories providing a cultural understanding of ICT diffusion, acceptance and adoption



Davies' technology acceptance model (TAM) (Davies *et al*., 1989) and later revisions were applied in sub-Saharan Africa to explain behaviour when using ICT (Lai *et al.*, 2017). The model suggests that people adopt ICT if it is perceived to be 'useful' and to have 'ease to use'. The theory of reasoned action (TRA) and theory of planned behaviour (TPB) extend the concepts of the TAM by adding that controlling behaviours such as an individual's attitudes are shaped by personal beliefs and the attitudes of others e.g. in their peer group or community, and by social norms of behaviour including culture. Negative experiences may also moderate behaviour such as social influences and fears of technology.

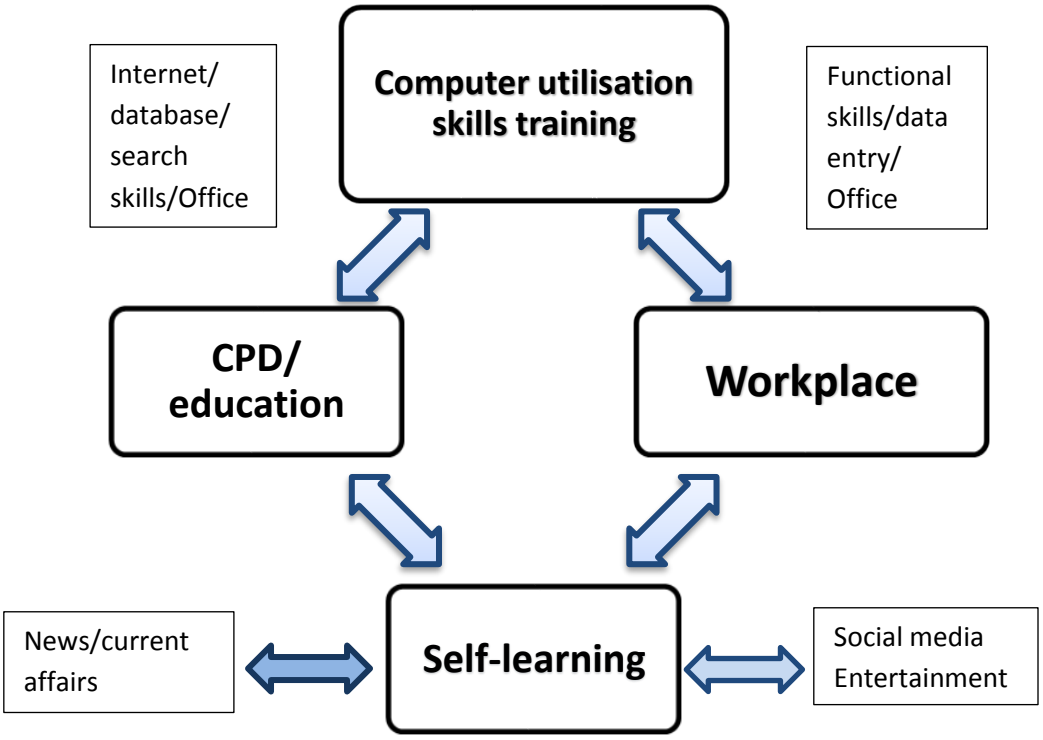
The theories of Hofstede *et al.* (2010), Rogers (2003) and Davies (1989) are described in the literature as theoretical frameworks (Lai, 2017; Wade, 2016) and represented as a synthesis in Figure 6.2. They help to define and explain or predict the pace of diffusion, acceptance and adoption of ICT at national level, organisationally (hospital) and individually at the research location.

2. What are the nurses' views and experiences of using computer technology?

Education/training/CPD/computer utilisation

Computer utilisation skills training served two main purposes in the research location: first, to enable nurses to use computers in the workplace, and secondly for educational purposes including CPD (see Figure 6.3).

Figure 6.3: Computer utilisation skills training – workplace and CPD enhanced by self-learning



Computer utilisation skills of the informants interviewed were self-reported as being either well developed, basic or non-existent. Some of the focus group informants had never had any interaction with computers or received training; these tended to be those nurses where the computer had not reached their ward or department. Others had basic training, but had not 'touched' a computer since. Several informants who had received basic computer skills training had continued to develop their skills though self-learning and discovery methods. Those who were required to use computer utilisation skills in the workplace, such as in the school of nursing and some wards and departments (not all), had more opportunity to practise their skills. Other nurses were encouraged to use their skills for CPD and

searching for clinical information, which worked out well for nurses who had access to a computer or laptop. Some nurses used skills in the workplace and for educational purposes, e-learning and professional development. Others declared uses were personal through accessing social media, news and entertainment.

Most informants expressed positive views about computer provision and training at the research location, although some expressed contrary views. Lack of training and technical support were cited by some nurses as contributing to their lack of skills, lack of experience, low confidence and fear of computers. However, although the training was available to them, there appeared to be lack of personal motivation or drivers to learn new skills unless required in the workplace. Davies' (1989) TAM provides an explanation of 'perceived usefulness' and 'ease of use' as factors in adoption of ICT. If circumstances change, such as a necessity to use ICT skills in the workplace, then this would become the motivating factor.

All nurses in the CPD programme were provided with CD-ROMs or USB sticks containing educational materials and information that could be accessed when the internet was not available, although the experience was enhanced if the internet was available to follow through links to selected websites. The CPD programme also taught nurses critiquing skills to search for research articles independently using recognised databases as part of the evidence-based practice component of the CPD programme. Data from the third focus group revealed a minority of nurses had not used the CD-ROMs or USB sticks provided to them and even asked what was on them.

Muliira *et al.* (2012), in a study carried out in Uganda, found that nurses with degrees are more likely to be committed to life-long learning and development of computer skills. The level of education is also linked to literature searching, ability to read scientific papers and critical thinking skills. They also found that increasing age and greater clinical expertise was a mitigating factor against lifelong learning.

Data from the research location illustrated that nurses who accessed computers and had their own laptops were able to develop their skills further, and those undertaking degrees had developed the more advanced computer skills needed to

complete online study. Enthusiasm and self-learning were factors in driving this forward. Most of the nurses were very committed to learning, but an older and more experienced nurse was concerned about age being a factor in being able to use a computer. A nurse tutor informant at the research location commented on the overall enthusiasm of the nurses on the CPD programme, and that their interest in evidence-based practice and searching for information had grown, but the challenge was still their limited computer skills. They did practise, which he thought was very positive.

Mugisha *et al.*'s (2009) study with health workers (including nurses) in rural Uganda proposed to promote and develop CPD through improved availability of ICT. CPD programmes would be revitalised with increased provision of computers, projectors and CDs, and basic ICT skills training. The evaluation demonstrated improvement in CPD participation and attendance, and increased use of electronic materials, ICT equipment and internet searches. They also found increased personal ownership of computers, CD-ROMs, USB sticks, digital cameras and mobile phones which impacted on motivation, self-directed learning and staff retention.

The data from the research location indicates similar findings. At the time of the CPD programme, ICT had contributed to the nurses' learning. They were taught using electronic equipment and used computers to enhance their learning. An increase in personal ownership of computers was demonstrated and a more general increase in computer equipment in the workplace. However, the latter was not specifically a result of the CPD programme, but a general development in the hospital ICT provision, including additional computers in the school of nursing. The data provides examples of the benefits of access to the internet, such as ability to retrieve clinical information and participate in professional updating to enhance individual practice. A tutor informant described how computers in the classroom enabled him to inform his teaching by disseminating up-to-date information to students. Rogers' (2003) theory also describes how early adopters can influence others to adopt technology, in this case through the example of using technology in teaching and learning, as illustrated in the data.

Evidence in Tabo-Olak's (2015) study suggested that healthcare professionals' insufficient exposure to ICT results in them having limited knowledge and skills. They also conclude that the level of ICT skills is a predictor of ICT use. The Muliira (2012) study suggested that the level of education influences the level and application of ICT skills. Rogers' (2003) diffusion of technology innovation theory suggested that the level of education, social status, culture and exposure to mass media also influence ICT adoption.

In addition, evidence from the research location demonstrates an increase in the number of nurses using computer technology, with enhanced computer utilisation skills and a growing number of adopters over the research period supporting Rogers' theory.

Role of libraries in support of CPD, e-learning and online learning, and computer literacy

There is evidence from the literature that libraries play a key role in supporting CPD through online learning (Hosey *et al.,* 2016; Mlay *et al.*, 2015; Smith *et al.*, 2007). At the research location, computer access was improving and developing independently of the library to support CPD and information access. Staff found lack of library facilities or up-to-date books a frustration, and access to online information was instead contributing to their professional and skills development. The computer facilities at the library were beginning to improve towards the end of the research, with additional computers and more up-to-date textbooks added.

An early study by Smith *et al.* (2007), although highlighting the increase in internet penetration and the potential for access to medical literature in sub-Saharan Africa, discussed the difficulties of accessing the internet for education. Prohibitive factors were cost and technical issues, an ongoing theme. The HINARI programme (WHO, 2002) allowed free access to a range of academic journals, but the initiative was largely unknown and thus underutilised. At this time, textbooks were the main source of information. More recently, Hosey *et al.* (2016) reported the launch in 2015 of an online CPD library for nurses in East, Central and South Africa, including Uganda. The website offers a range of accredited courses and modules which count

towards re-licensure. Typical barriers were identified initially such as limited internet, access issues and library resources. The CPD online library can only be sustained with ongoing funding, support and maintenance (ESCACON, 2017).

Although the importance of CPD is acknowledged throughout East, Central and South Africa to maintain clinical competence and updating for nurses, CPD is not a requirement for maintaining nurse registration in Uganda. The Ugandan Nursing and Midwifery Council policy (UNMC, 2016) makes no recommendations for CPD and declares there is no recognised programme. CPD does exist, but this appears to be on an ad hoc basis, organised locally in hospitals or provided through international projects.

The purpose of online or e-learning at the research location was to access educational materials for professional or clinical updating, or as part of a CPD programme or more formal degree programmes. Three senior nurses were currently undertaking part time degrees via online learning with a UK university, so were able to remain on site whilst studying. Other senior nurses had previously undertaken nursing related qualifications at other hospitals or universities in Uganda, either before or during employment at the research location, requiring blended learning approaches. Senior management at the research location were seeing the potential for online study to enable staff to remain in the research location, rather than going away for months at a time to gain qualifications and degrees.

> *…they will start to think and search for information and start to self-learn… – they are that example of being able to learn at a distance and still in the workplace – and study for their degree, so it is showing that it is possible and an alternative way of studying…*

Evidence at the research location demonstrated a positive attitude towards online learning and retaining staff at the hospital where they could combine work with study. However, once qualifications were gained and CPD completed, some staff moved to jobs elsewhere in Uganda. Again, access to online learning could contribute towards attracting new staff to the hospital and job enhancement of existing staff, but this needs to be promoted and facilitated.

The CPD programme designed for the research location was presented over three years, the sustainability of which was intended to be maintained through computer utilisation skills and access to the internet using appropriate clinical links. Unless CPD is supported and valued as essential for the job and education, and 'perceived to be useful' and 'easy to use or access', then it will not develop sufficiently resulting in limited adoption of technology. The TAM theory (Davies *et al.,* 1989) provides theoretical underpinning for this view as illustrated in Kyalo *et al.* (2013), whose research with lecturers concluded that adoption of online learning is associated with 'perceived usefulness' in job enhancement and positive attitudes in line with the TAM model.

Evidence from the literature continually refers to challenges posed to sustainability of CPD programmes by limited access to the internet, cost and lack of study leave (Chio *et al.*, 2012), plus limited access to computers, power supply and ICT skills (Yagos *et al.,* 2017). However, positive attitudes and perceptions can help to overcome these problems. Again, this corroborates Davies' (1989) TAM model

Benefits to nursing practice

ICT services are becoming a main feature at the research location with an increasing requirement for computer literacy. The developments in infrastructure and access to the internet were of benefit to the nursing staff if they had received skills training and had regular access to computers to practise new skills. A few nurses owned computers (or they were gifted or borrowed) and a growing number had regular access in the workplace. The evidence from the data demonstrated that in those circumstances, when nurses had gained basic skills and regular access to computers, they were able to maintain and further develop their computer utilisation skills and by implication were computer literate. Some informants talked about developing clinical practice by using search skills, and through self-learning and learning by discovery. The nurses undertaking degree programmes by distance learning had received additional training and had positive attitudes towards computer utilisation and skills development.

In Topkaya *et al.*'s (2014) research, nurses in clinical practice can benefit by accessing information via a computer, and computer literate nurses had positive attitudes towards using computers in the workplace. These findings also concur with research undertaken by Bada *et al.* (2016) who concluded that computer literacy is a major factor in ICT skills development and the delivery of ICT based health services. Network connectivity, access to online information, and attitude towards ICT usage were all prerequisites of making use of the service. ICT usage also depends on computer literacy whether it is for learning or enhancement of services (Mugisha *et al.*, 2009). The research by Mugisha (2009) also demonstrated that the training that staff had received contributed to personal ownership of computers, CD-ROMs and USB sticks, and assisted in self-directed learning.

The first Ugandan National Nursing and Midwifery Council (UNNMC) policy (MHU, 2016) exemplified a comprehensive approach to policy making, setting out best practice recommendations and guidelines for nurses. However, in the policy there are no references to or recommendations for development of computer-based skills specifically for nurses, or utilising such skills in learning or teaching. The policy recognises that research is the 'cornerstone' of evidence-based practice, yet there is a lack of a research agenda in nursing which is required to build its research capacity. It is addressed in its recommendations. It is also stated in the policy that there is no professional development plan (CPD) for nurses and midwives, and that gaining permissions and funding from employers for further professional development was very difficult. However, in contradiction to the UNNMC (MHU, 2016) policy, a CPD framework was published by the UNNMC in 2016 which outlines accreditation procedures for nurses and education providers. The literature review and the research data revealed that CPD programmes and computer skills development are local initiatives, often funded through international partnerships, and where they exist confer benefits to the workforce; many of these initiatives prepare nurses in computer utilisation skills. The CPD programme offered at the research location reflects these factors.

Summary

Overall, the factors that facilitate learning and development of computer skills are present in the research location. These include a reliable electricity supply, access to the internet, and a mainly reliable 'signal' albeit one that may be affected by external factors such as infrastructure development, adverse weather conditions and internet subscriptions. There is an increasing number of computers in hospital departments and the school of nursing, meaning that staff working in these areas have increased access to computers in the workplace and ongoing opportunities for skills development. The need for obtaining up-to-date clinical information in the workplace and for ongoing professional development and CPD was expressed in the data.

An important statement was made by a senior nurse about using computers in the workplace:

> *…sometimes you don't know something is important until you realise that it is necessary for your work…*

The realisation of 'perceived usefulness' is expressed in this remark, and is a strong motivating factor to learn and maintain computer utilisation skills for job enhancement. Again, Davies' (2003) TAM underpins this belief and the second research question.

3. Is the professional development of nurses and how they utilise computer technology influenced by policy and culture?

This research question considers how the CPD of nurses and their utilisation of computer technology is influenced by polices and culture, and whether cultural theories influence computer utilisation skills development.

Policy influences

There is clear evidence of systematic policy making processes at government and departmental level as elicited from a theoretical analysis of selected policy documents by applying Walt (1984, 1986) and Buse *et al.* (2005) policy making criteria. National policies are in place for the strategic development of the ICT infrastructure, internet penetration and skills development across all sectors.

Examples include Uganda Vision 2040 (MHU, 2012) and the NDP11 (MHU, 2015) These policy documents revealed a targeted and coordinated approach across all government sectors, including health and higher education, to developing ICT infrastructure and skills development; the documents refer to 'healthcare workers', though nurses are not directly mentioned in these policies.

A further search was undertaken of the Uganda Government Portal and the Uganda NMC websites to discover any further policies or guidance pertaining to nursing. The first Uganda National Nursing and Midwifery Draft Policy (MHU, 2016) stated there are no plans for a CPD strategy at the current time. However, the UNMC had simultaneously published a CPD Framework for Nurses and Midwives (UNMC, 2016) that set out core competencies to be achieved in a three-year period. The existence of two contradictory policies may lead to confusion. The National Nursing Policy (MHU, 2016) does state that it has been developed within the context of the Ugandan National Health Policy and the Health Sector Strategic Plan and will be implemented in the same way and evaluated by the Department of Nursing in the Ministry of Health. For example, Uganda Vision 2040 (MHU, 2012) and NDP11 (MHU, 2015) made references in general terms to health care workers and computer skills development. The Ministry of Health knowledge management portal is available from the UNMC website for all health care personnel, and contains links to online resources as a single point of access to facilitate evidence-based practice, but is not targeted specifically at nurses.

Orem *et al.*'s (2012) research, based in Uganda, made significant points about reducing the bureaucracy in policy making, the importance of using evidence and the need for policy makers to understand the research processes involved. Spero *et al.*'s (2011) research demonstrated that stakeholders were closely involved in the policy making process when the UNMC introduced the HRIS database for nursing registration, and this feeds into the planning strategy for the Ugandan health care system.

In conclusion, there are two nursing policies published: the first by the Ministry of Health (MHU, 2016) and the second by the UNMC (UNMC, 2016). The first barely

mentions CPD; and in the second, CPD is its primary focus and should directly influence or guide CPD for nurses in the future. The CPD framework briefly mentions web-based instructional materials and computer application skills which is a good starting point for computer skills development. In the recent MHU (2016) policy it is unknown why the introduction of technology into nursing practice and the development of computer utilisation skills are not mentioned. Despite the initial good practice identified in policy making, the means of ICT diffusion thorough the first UNMC (2016) policy are absent, so making national adoption by nurses more difficult.

Evidence from the research literature relating to Uganda (Hosey *et al.*, 2016; Maria *et al.*, 2016; Muliira *et al.*, 2012) and from the research location data clearly demonstrates CPD programmes are in place for nurses, with associated development of computer utilisation skills, albeit not continuous. It is too soon to evaluate whether recent nursing policies have impacted on the delivery of nursing CPD programmes and computer utilisation skills development, but it is hoped that the guidance will influence future provision. National policies may have an impact over time through strategic development of health services, as described in the NDP1 and NDP11 documents (MHU, 2010, 2015). The promotion of ICT in schools is high on the agenda and the Ugandan Schools and Education Policy is likely to have the biggest impact on the computer skills of student nurses entering directly from school, who should have at least basic computer skills.

Culture

Informants in the research location, as well as citing infrastructure, technical and financial barriers to accessing the internet, also cited cultural and social factors that influence the acceptance and adoption of ICT. The data analysis illustrated different perceptions of culture described by informants when asked to give examples of cultural influences (see Figure 5.9). The thesis explored explicit descriptions of culture from an individual perspective and tacit inferences from participant observation, and these are summarised as cultural themes following Spradley's DRS (McCurdy *et al.*, 2005; Spradley, 1979, 1980). The cultural themes are described as: national, local and alternative cultures; ICT, service and care cultures; reading, oral,

communication and learning cultures; and culture of lifestyle. These were further aligned with and analysed by applying Spradley's six universal cultural themes.

The data and cultural themes emerging from the data, such as the national, local and ICT cultures, are identified as influencing factors in the successful implementation of ICT. Haviland *et al.*'s (2013) barrel model of cultural analysis refers to the national ideology, the social structure of organisations and individuals in society, and the economic foundation. Haviland *et al.* (2013) explain how cultural adaptation and change occur over time, which may be in response equally to environmental change or technological innovation, resulting in modification of behaviour and cultural values. Further to this, Hofstede *et al.*'s (2010) five dimensions of national culture explain that sub-Saharan Africa, which includes Uganda, exhibits slow economic growth accounting for delayed uptake in ICT adoption. Further to this, the five dimensions provide a means to analyse the cultural characteristics of western and developing countries. An account of the national culture of Uganda described in Vision 2040 (MHU, 2012) declares that Uganda has in fact no national culture. The NDP11 (2015, p.66) refers to Uganda's "diverse and fragmented cultural heritage embraced within sixty-five indigenous communities". The NDP11 (2015, p.67) plan aims to "nurture culturally conscious citizens… to participate in government programmes in pursuit of wealth creation and sustainable development'. By implication there is no 'one culture' in Uganda. Therefore, cultural sensitivities must be applied when undertaking a CPD programme and introducing new knowledge and skills in nursing practice in Uganda or other sub-Saharan African country.

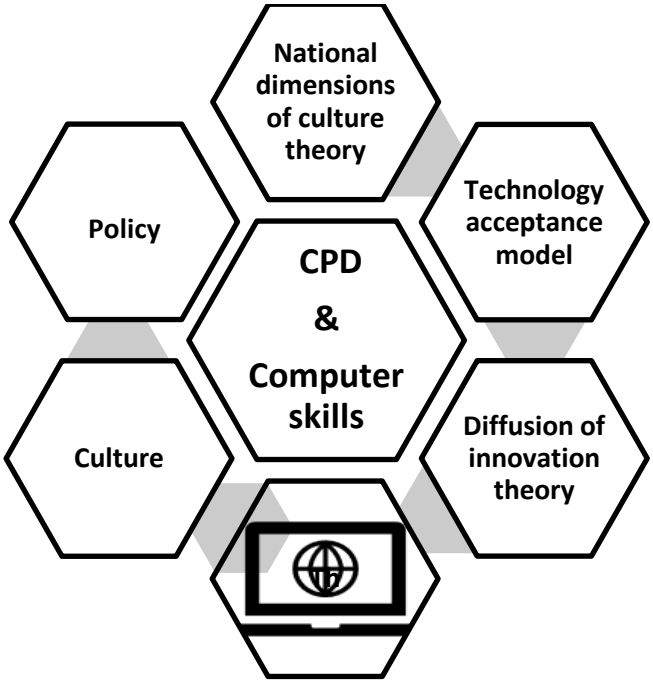
In the research location, at local level, the culture of the hospital reflects an integration or interface between social and professional, and western and Ugandan cultures. Western culture may be influential in the facilitation of ICT development in the research location, while the national cultural influences are characterised by slower adoption and implementation rates (Hofstede *et al.*, 2010).

In the context of the research location, individual nurses are influenced and interact with developments and activities in the immediate environment e.g. the hospital as

a workplace, advances in computer technology, computer skills training and CPD. Nurses are also exposed to a wide range of social, cultural and subcultural influences during their lifetime. The differences in individual ICT adoption at the research location may also be accounted for by other cultural themes and perceptions expressed by informants, such as reading and learning cultures that are moving from more traditional methods towards online learning.

The discussion on policy, culture and theories that impact on computer utilisation skills and CPD are synthesised to represent multifactorial influences in Figure 6.4.

Figure 6.4: Synthesis of policy, culture and theories that influence individual computer utilisation skills in association with CPD



Strengths and limitations of the study

The research was undertaken in a unique location in Uganda, in a faith-based hospital and community. ICT infrastructure was developing nationally and locally, skills training was established, and a growing number of nurses had computer skills. This was a good starting point on which to take forward the research.

The strength of the study proposal was that it was recommended as part of a capacity building programme bid funded through THET and the BC. The study

gained ethical approval from both the UK university and the Ugandan hospital research committee. The data collection was undertaken between 2009 and 2012 on four separate field visits and on two visits to the UK by Ugandan nurses in 2013. This provided scope to observe individual and organisational developments at the research location over the full three years of the CPD programme.

Ethnography as the research methodology and application of Spradley's Developmental Research Sequence is a strength of the research. This enabled a chronologically structured and descriptive approach to the analysis of the research data, demonstrating changes and developments during the timeframe of the research.

Each of the four field visits undertaken by the researcher was also a data collection period at the research location. The limiting factors were time and the availability of informants during each visit. Each visit lasted two weeks; although participant observation was ongoing, interviews and focus groups were arranged on an opportunistic basis. Several informants were interviewed on more than one occasion, and some took part in more than one focus group, providing continuity of data.

Nurse informants included in the research were preselected to undertake the CPD programme by applying the following criteria: experienced nurses either in charge or deputy of a ward or department, tutors or other senior positions. This constituted a limited cohort of nurses to potentially interview and take part in focus groups. Other informants such as medical or administrative staff were purposefully selected by the researcher to provide different perspectives and validation.

During the research period, some nurse informants left the hospital and CPD programme to move on to other jobs, and new nurses joined, creating a turnover of staff. Some new informants joined the programme. This is a strength of the CPD programme, meaning that nurses leaving had gained new skills attractive to other employers, and new nurses would benefit from joining the CPD programme. In total the number of nurses benefiting from CPD increased. However, the lack of

continuity of informants available to be observed or interviewed can also be considered a limitation of the research.

The researcher adopted a relaxed style of engagement with informants during participant observation which enabled informal conversations to take place; this contributed to a rich set of data on which to develop the research further. Relationships were often established with informants prior to interviews and focus groups, enabling detailed and honest responses to questions and respondent validation to be undertaken as appropriate.

Respondent validation was carried out on each successive field visit by discussing anonymously the previous research findings from participant observation, interviews and focus groups. In repeat interviews, the informant was reminded of their previous interview content. Two nurse informants were interviewed again after leaving the research location and were able to provide respondent validation spanning the whole research project, which is considered a strength of the research.

Further strengths of the thesis are the analysis of data and integration of literature, policies, culture and underpinning theories in the discussion chapter to establish their relevance to the data. The research findings establish that computer utilisation skills are influenced by national and local culture and cultural perceptions, and can be analysed using cultural and technological theories. National policies have enabled the ICT infrastructure to develop which provides the foundation for ICT service developments at the research location. There is an indirect impact on nurses' computer utilisation skills through national policy, but no evidence of nursing policy directly influencing them. A new CPD framework provides the basis for accredited professional development programmes, but implementation is unclear at this time.

The pace of ICT development in the global reach and diffusion of ICT was rapid before, during and after the final set of data was collected in 2013. This could be a limitation; however, the researcher has ensured that the analysis of data is

contextualised within most recent policy developments in Uganda and from international research publications to reflect dynamic developments.

On conclusion the overall strengths of the research outweigh its limitations.

Reflexivity

Practising reflexivity is an important part of undertaking ethnographic research and the researcher must be cognisant of their potential personal influence and bias in all aspects of the research process. To overcome this, the researcher is aware of her own personal values and cultural beliefs that are in contrast to those in the research location, in this case a hospital in Uganda.

The researcher explored the meaning of culture and cultural differences from a theoretical perspective in the early stages of the research. This heightened her awareness of being culturally sensitive in the conduct of the research and maintaining an open mind, especially in the observation of cultural practice and in the exploration and analysis of informants' perceptions of their own culture. The different cultures experienced by the researcher and Ugandan informants are reflected in Hofstede *et al.*'s (2010) cultural dimensions as the contrast between western and developing country characteristics. This was a useful tool that enabled the researcher to reflect on values and attitudes towards cultural differences and applying them to the understanding of ICT development, why Uganda lags behind western countries, the variation in skills development and informants' participation in the CPD programme.

As the researcher became more immersed in the culture over the period of fieldwork, the implications of studying a different culture became apparent. Two opposing positions are presented, that of the researcher or 'outsider' who takes the 'etic' perspective and the informants or 'insiders' who have the 'emic' perspective or insider view of the culture being studied (Spradley, 1979, 1980). However, in postmodernist thinking, the researcher is acknowledged as being part of the research process, someone who collates knowledge through interaction with others (Bryman, 2016). This is illustrated in this research: on successive visits to the research location, relationships developed and more in-depth descriptions of

activities and culture were expressed by informants through participant observation, interviews and focus groups.

The researcher acknowledges Hammersley's (1990) assertions that the informant may be influenced by the researcher, rendering their behaviour unrepresentative. In interviews, questions may not be culturally sensitive, and thus impact on the response. In data analysis, what to include and what to leave out may be influenced by the researcher's bias, values, interest or preferences. These points were addressed as follows:

The researcher adopted a reflexive approach throughout the research by firstly maintaining an open mind when observing cultural difference, being objective and checking out informant descriptions through respondent validation. In addition, the descriptive ethnographic approach to the research enabled a true account of observations and participant observations to be documented, recording what was observed and what was said by informants. The researcher is committed to representing the views of informers accurately without further interpretation.

The researcher made meticulous contemporaneous notes in a diary throughout field visits, making observations on what was seen whilst travelling through Uganda, the hospital itself and environs, and what people said informally. These observations of activities and cultural perspectives were integrated with formal recordings of interviews and focus groups to gain greater understanding of computer utilisation and CPD and how the influences of policy and culture were expressed by informants.

Spradley's Developmental Research Sequence (DRS) is the method chosen to present the research and to analyse and synthesise data, demonstrating research credibility and objectivity through respondent validation and reflexivity; by acknowledging limitations of the research; and by adherence to ethical principles in the design and conduct of the research.

Davies (2008) discusses that selecting informants is a potential area of bias; however, informants were preselected to be part of the CPD programme by using

criteria based on experience and nursing roles in the hospital. The informants were then purposefully selected for interview and invited to attend focus groups from within that sample.

Representing accurate views of informants formed the basis of this research and comments were collated into domains and taxonomies to enable further componential analysis and the discovery of cultural themes. Acknowledgement of the reflexive approach by the researcher is essential to ensure that there is no bias in writing up data and faithfully representing the informants' views. Davies (2008) comments that the researcher chooses what information to include from observation and interviews, and what is written in the final ethnography is a potential area for bias. In this research full verbatim comments were included, and comments synthesised to represent both congruent views of informants on one hand and contrasting opinion through Spradley's componential analysis. Inevitably, not all recorded comments were included verbatim in the data analysis but exceptions were summarised to represent their meaning. Likewise, general observations, participant observation and reflections amounted to a large volume of notes and only relevant details pertinent to the research questions were included.

Roper *et al.* (2000) discuss the role of the researcher as an outsider who brings the 'etic' perspective to the research. However, over a period of time through cultural immersion the researcher started to embrace the insider or 'emic' perspective and gained a deeper understanding of the culture and indigenous people as discussed by Roper. The researcher acknowledges that over the course of the research, more in-depth views were expressed by informants about cultural influences on the utilisation of computer technology and CPD in the research location, and a deeper understanding of those influences were acquired by the researcher.

Conclusion and answering the questions

The discussion chapter answers the research questions by providing a distillation and synthesis of the data, literature, policies, culture and underpinning theories that influence the development of nurses' computer utilisation skills and CPD. It

outlines the strengths and limitations of the research and acknowledges reflexivity of the researcher.

Chapter 7: Conclusion and Recommendations

Introduction

The final chapter concludes the thesis by providing an overview of the research findings, implications and the emergence of new knowledge, and makes recommendations for policy, practice and further research.

The study explores the experiences and views of nurses who use computer technology to support their continuing professional development (CPD). To further facilitate the CPD of nurses, the significance of ICT emerged as a critical factor which is influenced by prevailing policy and culture.

Overview of research findings

The focus and potential of the research is encapsulated in Chapter 1 of the thesis. This is reiterated below and forms the basis of the research questions, emerging new knowledge and recommendations.

> …The focus for this PhD study is to research the impact of the CPD programme on the continuing professional development of nurses by exploring nurses' acquisition and application of new knowledge and skills in relation to the utilisation of computer technology. In addition, the influences of culture and … policies are considered as potential factors in their acquisition and utilisation. It is anticipated that the utilisation of computer technology has the potential to influence capacity building and long-term sustainability of the CPD programme in the research setting, and the capacity to influence nursing development beyond the research setting itself... (Chapter 1, p.22)

The thesis addresses how the data from the study is supported by the literature, policies, culture and underpinning theories, and their significance in understanding how nurses have adopted technology and developed computer utilisation skills which have contributed to their continuing professional development.

New knowledge emerging from the research

New knowledge and implications that emerged from the research are listed under the following headings: Gaps in the literature; the data; research methodology and cultural themes; policy review; application of ICT and cultural theories; and

synthesis of ICT diffusion, acceptance and adoption theories. These are detailed below and summarised in table 7.1.

Gaps in the literature

The gaps identified in the literature pertain to nurses' engagement with CPD and computer technology, policy making and the impact of culture in Uganda. Although some of the literature considers these factors, they relate to medical staff, nurses and healthcare workers collectively, not exclusively to nurses or nursing (Mugisha *et al.*, 2009; Yagos *et al.*, 2017). The literature on IT policy formation in Uganda refers to lack of evidence in the policy making process (Orem *et al.*, 2012). Other papers suggest policies in developing countries are ineffective and should be targeted at infrastructure and e-learning (Ejaku, 2014; Frehywot *et al.*, 2013). Numerous research studies explore culture as a facilitator or barrier to learning and ICT adoption situated in western and developing countries (Albrini, 2006; Kaba *et al.*, 2013), but studies in Uganda focused mainly on reading culture (Bukachi, 2009; Mlay *et al.*, 2015). Several papers apply ICT diffusion, acceptance and adoption theories in developing countries including Uganda, but not specifically to nurses or nursing (Isabalija *et al.,* 2011; Lee *et al.*, 2013).

Three research questions were derived from the literature review. A brief summary of the data findings follows:

The data

Nurses' computer skills development ranged from none to basic to more advanced skills. Nurses with more advanced skills were fully participating in online learning, accessing CPD, were competent in the workplace and teaching using ICT skills. An increase in laptops and computer provision provided more opportunity for skills development and consequent access to CPD over the course of the research. Differences in adoption and utilisation of ICT by nurses is partly explained by the level of computer skills training received at the research location; training received elsewhere; ease of access to computers and laptops; and whether computer skills are required in the workplace. The level of enthusiasm and general attitude towards learning and CPD expressed by informants impacted positively and

negatively on the level of skills development, and nurses undertaking higher levels of study demonstrated more advanced skills. Many nurses even with limited access remained enthusiastic and motivated to learn. However, others found limited access a demotivating factor. Culture, fear of technology and older age were also cited as factors impeding learning.

Research methodology and cultural themes

The application of Spradley's DRS (1979, 1980) enables a comprehensive analysis of the data, resulting in cultural themes unique to this study. Ten cultural themes expressed by the informants contributed to understanding the 'emic' perspective in how traditional and contemporary cultures influence ICT adoption nationally and locally, the development of computer utilisation skills and the continuing professional development of nurses. It is anticipated that the themes are generalisable to other CPD studies where ICT is a factor in its delivery.

Spradley's DRS (1979, 1980) is applied in ten ethnographic research studies identified in a comprehensive search of published literature. The studies partially applied the DRS to participant observation and interviews, but no other research papers identified applied the DRS to focus group analysis.

Policy review

Policy review and analysis offers a unique insight into the process, content and context of policy making in Uganda, following Walt *et al.*'s (1994) policy analysis model. As part of this thesis, a policy search and a review were undertaken of the Uganda Government Portal to determine the extent to which policies existed and were influential in the implementation of ICT development, the CPD of nurses and utilisation of computer technology either directly or indirectly. There is no evidence, however, of policy reviews from recent research carried out in Uganda that analyses the impact and influence of policies on nurses' computer skills development and ICT adoption.

National policies confirmed that the National Development Plan (MHU, 2015) for technology and the national backbone infrastructure is being implemented throughout Uganda, but national diffusion to healthcare settings in Uganda is

variable. ICT systems at local level are in place and being developed to support health services delivery at the hospital. Policy influences on CPD and computer skills utilisation for nurses are indirect. There appears to be a ripple effect from the impact of national government policies on development of computer utilisation skills for 'healthcare workers' resulting from the National Hospital Policy, the NDP11 (2015) and the National Schools Policy to ensure all school children are computer literate.

The first Ugandan National Nursing and Midwifery Policy (MHU, 2016) stated that there was no CPD plan for nurses or midwives, and that obtaining permissions and funding for development from employers was difficult. However, the UNMC (2016) simultaneously produced a CPD framework for nurses and midwives, which raises issues of coordination in development of such policies. The framework and accreditation processes are outlined briefly and refer to development of computer application skills and web-based learning materials, but the guidance is yet to be fully implemented, and was not available at the time of this study.

The data thus provides evidence of the need for nursing specific policies to support a consistent approach to CPD and the development of computer utilisation skills for nurses.

Application of ICT and cultural theories

ICT and cultural theories are applied generally to assist in understanding individual and national responses to ICT diffusion, acceptance and adoption including pace of national adoption and implementation, perceived ease of use by users of the technology and rate of adoption (Davies *et al.*, 1989; Hofstede *et al.*, 2010; Rogers, 2003). Haviland *et al.*'s (2013) model of culture describes how cultural adaptation occurs over time in response to technological innovation.

The principles of the theories are applied to Uganda nationally and locally to explain nurses' ICT acceptance and adoption of computer technology and engagement with CPD. The local impact of technology and ICT developments in the hospital provision and increasing adoption are demonstrated in the data.

Hofstede's dimensions of national culture are applied to Uganda to determine the impact of culture on ICT adoption and implementation. . Uganda is experiencing increased economic growth more characteristic of western cultures, indicating that the status of Uganda as a developing country is beginning to change. The research location also reflects a unique mix of western and Ugandan cultures.

Application of Davies' (1989) technology acceptance model (TAM) potentially provides a strategy for successful teaching of basic skills that promotes the 'usefulness' of computer utilisation skills to access online CPD and clinical updating. When teaching skills for finding and critiquing information, 'ease of use' should be demonstrated by allowing nurses to practise their skills by providing computer access. Informants demonstrated 'ease of use' and 'perceived usefulness' in the data.

Application of Rogers' (2003) diffusion of technological innovation theory considers early and later adopters of technology. This theory is applied to harness the more developed computer utilisation skills of early adopters to support skills development in the later adopters, leading to a critical mass of nurses with computer utilisation skills. Early adopters also positively influence others to overcome their fears and to start engaging with ICT. Early and late adopters are illustrated in the research data.

Synthesis of ICT diffusion, acceptance and adoption theories

Theories of ICT diffusion, acceptance and adoption are explored and synthesised to increase understanding of the multiple influences at national, local and individual levels, that lead to ICT adoption, development of computer utilisation skills and the increased levels of CPD experienced at the research location. Cultural themes and the impact of policy development are also major influencing factors on nurses' continuing professional development and utilisation of computer technology.

The synthesised theories demonstrate their potential for integration into a theoretical framework of analysis for application in similar research.

Table 7.1: Summary of gaps in the literature, new knowledge emerging from the research, implications and recommendations

Relating to Uganda	Gaps in the literature review	New knowledge emerging from the research	Implications and recommendations
Nurses' engagement with CPD and computer technology	Specific gaps are identified in the literature concerning nursing and the provision of CPD and computer skills training.	The research identified that the level of computer skills development enhances continuing professional development, and this is influenced by policy and cultural factors.	When CPD programmes are offered they are combined with ICT access and support to enhance learning and CPD.
Policy review	There are no policies that directly address nursing in relation to CPD or computer skills development at the time of the research (2013).	The data provides evidence of the need for nursing specific policies to support a consistent approach to CPD and the development of computer utilisation skills for nurses.	The UNMC (2016) produced a CPD framework and recommendations for CPD content and implementation. This needs to be rolled out and monitored. The CPD framework should contain recommendations for development of computer literacy skills.
Culture	There is limited specific research on the impact of culture on diffusion of technology and adoption in developing countries. Cultural themes from the data analysis provide a unique perspective.	Cultural knowledge and understanding are expressed by informants and grouped under cultural themes to provide new knowledge from the 'emic' perspective on cultural influences on ICT adoption nationally and locally, and the development of nurses' computer utilisation skills and CPD in the research location.	Cultural themes provide a framework for analysing the potential impact of culture in similar research.
Application of ICT theories	ICT theories in the literature are not applied specifically to	In this thesis, the principles of the theories are applied to Uganda and locally to explain	That the ICT theories can be applied to nursing.

Relating to Uganda	Gaps in the literature review	New knowledge emerging from the research	Implications and recommendations
ICT diffusion, acceptance and adoption theories	nursing or nurses' acceptance or adoption of ICT.	nurses' ICT acceptance and adoption of computer utilisation and engagement with CPD.	
Synthesis of ICT theories	Selected ICT theories from the literature are applied separately or in combination to explain diffusion, acceptance and adoption (Hofstede, Rogers & Davies), not all three cited together. None are directly applied to nursing and ICT.	ICT theories synthesised in this thesis demonstrate their potential for integration into a theoretical framework. This enables a comprehensive analysis of influencing factors, including the influence of culture (as contained in the theories), that are applied to nursing and nurses' computer skills development and CPD.	The synthesis of ICT theories can be applied to nursing.
Synthesis of ICT, culture and ICT theories	Policy, culture and ICT theories	In addition to synthesis of ICT theories, the influence and impact of policy and culture on nurses' CPD and computer utilisation skills were analysed in combination in the thesis.	Policy, ICT and cultural theories were synthesised to demonstrate their potential integration into a theoretical framework of analysis to be applied in similar research.
Research methodology – Spradley's DRS (1979, 1980)	Ten identified research papers applied Spradley's DRS. Of these, none applied the DRS fully to all aspects of the research.	Spradley's DRS was applied comprehensively to participant observation, interviews and focus groups resulting in ten cultural themes from the data unique to this thesis. No other research identified applied the DRS to focus group analysis.	Spradley's DRS appropriate to use as a framework for descriptive or realist ethnographic research

Recommendations for policy, practice and further research

Recommendations for policy

The first Ugandan NMC policy produced by the Ministry of Health (MHU, 2016) does not include recommendations for CPD or computer literacy.

- It is recommended that when the Ugandan NMC Policy (MHU, 2016) is revised, it incorporates CPD requirements as laid down in the CPD Framework (UNMC, 2016). This will ensure that every nurse engages in an accredited professional development and updating process to maintain their nursing licence or registration on a regular basis (e.g. every 3-5 years). There is already a national portal available from the UNMC website to support this.
- It is recommended that a policy is written to guide the development of computer literacy skills for nurses. This will enable nurses to engage with computer utilisation skills requirements in the workplace, for CPD, educational advancement and research. It is recognised that nurses are engaging with CPD and are developing computer utilisation skills in the research location as a result of ICT developments and the provision of a CPD programme. However, these developments are currently recognised by the Ugandan NMC as ad hoc, provided through local initiatives or limited international funding programmes.

Recommendations for practice

These are recommendations for nurses who plan to teach a CPD programme or undertake research in a developing country. They are based on the practical experiences of the researcher and evidence from data analysis whilst undertaking research in Uganda. Sustainability of CPD programmes and dissemination of nursing research are major considerations for practice.

- It is recommended that when developing CPD programmes for nurses that the content reflects the Ugandan CPD Framework (UNMC, 2016) for content and accreditation.

- It is recommended that the current CPD framework changes from advisory to mandatory.
- Cultural differences and cultural sensitivity are key. There is a need for sensitivity to different cultural practices and how ICT is utilised in the workplace, and awareness of different professional practices that are influenced through culture.
- When planning to undertake teaching or research in a developing country, either individually or as part of a team, a working knowledge of the background and culture of the country is essential; for example, to enable tailoring of an appropriate culturally sensitive CPD programme. Knowledge of Hofstede *et al.*'s (2010) dimensions of national culture is valuable in understanding the differences between cultures in western and developing countries.
- The ten cultural themes that emerged from the research data indicate key areas to be taken into consideration when planning a CPD programme in a similar research setting – see table 5.27 and figure 5.9.
- It is recommended that computer utilisation skills are incorporated into CPD programmes to enhance learning, to enable self-directed learning and long-term sustainability.
- The researcher suggests that offering an annual or biennial CPD programme with additional computer skills training would:
    - act as a magnet to attract new staff to the research location;
    - assist in retention of existing staff;
    - lead to long-term sustainability of the CPD programme;
    - lead to dissemination of current nursing practice and influence nursing development beyond the research setting.
- It is recommended that nurses are involved in developing the educational materials they plan to deliver for CPD in collaboration with recipients of the CPD programme. They should ascertain the extent of local ICT development as far as possible before arrival in the field and make contingency plans in advance for situations where internet resources are limited.

- It is recommended that the online CPD library maintained by ECSACON is available for nurses to access in the research location. This provision is clearly an asset to nurse education and CPD; however, its existence needs to be promoted throughout Uganda by the UNMC to influence nursing development.

Recommendations for future research

Research methodology

- It is recommended that Spradley's (1979, 1980) DRS is considered as a methodological framework when undertaking ethnographic research to guide the conduct of the research and the analysis of data. It offers a systematic and comprehensive approach to data collection and analysis when undertaking participant observation, informal conversations and interviews. It is also applied to focus group analysis in this research. It can be partially applied and adapted as discovered in the literature.

Theoretical framework

- Develop an integrated theoretical framework based on theories applied in this research. Deploy in future research that explores ICT diffusion, acceptance and adoption in relation to CPD in similar sized locations in Uganda or a developing country.

In the research location

- It would be instructive to follow up the research in the research location to determine current development and progress towards computer literacy and impact of CPD on the nursing workforce.

Uganda

- Undertake research to establish the location, content and frequency of CPD programmes throughout Uganda or selected locations.
- Undertake similar research elsewhere in Uganda to compare with the findings or further research in another developing country to:

- establish the extent to which computer technology and skills are part of CPD programme content and delivery;
- make recommendations based on the findings for future sustainable implementation.

Dissemination of the research

In the research location

- There is a responsibility to share the research findings with those who contributed to data collection and its completion in the research setting.
- The thesis will be summarised and made available to them in the first instance.

To those who have left the research location

- These include several senior members of the nursing and medical profession who now work in other organisations in Uganda.

The Ugandan Nursing and Midwifery Council

- The summary and recommendations for CPD and developing computer utilisation skills will be made available to the Ugandan Nursing and Midwifery Council.

Publication

- Opportunities for publication of the research findings through journals or conferences will be taken forward.

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Appendix 1: Ethical approval

EMW/bh

19th April 2011

Frances Wilson
Senior Lecturer
Department of Community & Child Health
Faculty of Health & Social Care

University of Chester

Faculty of Health and Social Care

Tel 01244 511000
Fax 01244 511270

Dear Frances

Ethical Approval Granted

FH&SC Ethics Number:	RESC0311-277
Course of Study:	PhD Health & Social Care
Supervisor:	Professor Helen Cooper & Professor Tom Mason (FH&SC) and Dr Martin Evans (Department of Geography and Development Studies)
Student Number:	920013452

I am pleased to inform you that the Research Ethics Sub Committee of the Faculty of Health and Social Care have approved your project *"An ethnographic study of the cultural dimensions and impact of the 'e' learning component of a continual professional development (CPD) educational programme delivered to nurse tutors and senior nurses based in a community hospital in Uganda."*

Approval is subject to the above and following conditions:

1. That you provide a brief report for the sub-committee on the completion of your project.
2. That you inform the sub-committee of any substantive changes to the project.

May I take this opportunity to wish you well in the completion of your project. If you require any further assistance please contact Barbara Holliday on 01244 511117 or by email b.holliday@chester.ac.uk

Yours sincerely

Professor Elizabeth Mason-Whitehead
Chair, Faculty Research Ethics Sub-Committee

cc Research Knowledge Transfer Office
cc Academic Supervisor(s)

23rd November 2012

Dr. Jan Gidman & Frances Wilson
Faculty of Health & Social Care
University of Chester
Riverside Campus
Castle Drive
Chester
CH1 1SL

University of Chester

Faculty of Health and Social Care

Tel 01244 511000
Fax 01244 511270

Dear Jan & Frances

Ethical Approval Granted

FH&SC Ethics Number: RESC1012-368
Course of Study: N/A Staff Project
Supervisor: N/A
Student Number: N/A

I am pleased to inform you that the Research Ethics Sub Committee of the Faculty of Health and Social Care have approved your project ***"Evaluation of a Partnership Project to Develop and Support Capacity Building of Quality Health Care Programmes in Kisiizi Hospital."***

Approval is subject to the above and following conditions:

1. That you provide a brief report for the sub-committee on the completion of your project.
2. That you inform the sub-committee of any substantive changes to the project.

We approve your application to go forward to the next stage of the approval process. If you are applying to IRAS and require a sponsorship letter and insurance documentation please contact Barbara Holliday.

If you have any questions or require any further assistance please contact Barbara Holliday on 01244 511117 or by email b.holliday@chester.ac.uk

Yours sincerely

Professor Elizabeth Mason-Whitehead
Chair, Faculty Research Ethics Sub-Committee

cc Research Knowledge Transfer Office
cc Academic Supervisor

Appendix 2: Information for participants and consent form

Study Title

An exploration of nurses' IT skills and experiences of using internet technology for CPD and an observation of the cultural influences on this process

Study background information

The overarching aim of this partnership project is to support Kisiizi in their educational and practice development over a three-year project period commencing in September 2009. In 2008 representatives from the Countess of Chester Hospital and the University of Chester visited Kisiizi Hospital and School of Nursing, Uganda. Recommendations were made to provide a comprehensive programme of continual professional development (CPD) to enable nurses and tutors to develop leadership, management and mentorship skills to facilitate changes in practice and provide mentorship to student nurses. Further visits have taken place in September 2009, March 2010, September 2010 and April 2011 by clinical nurses from the COCH and lecturers from the UOC to provide teaching and support in practice as part of the CDP project implementation. **It has also been suggested that developments in computer and internet technology may be required to enhance and sustain learning and advance the project. It is this aspect that is being explored in this study**

Invitation to take part
You are being invited to take part in a research study. Before you decide if you want to take part it is important to understand why the research is being done and what is involved. Please discuss it with others on the programme to help you decide. Please ask me if any information is unclear or if you have any further questions or need any more information

Why have I been chosen?
You have been chosen because you are directly involved in the project as a participant and your opinion is very important

Do I have to take part?
No, it is your choice whether or not to take part. If you do decide to take part, you will be given this information sheet and asked to sign a consent form. Even if you decide to take part you can still withdraw at any time and you do not need to give a reason for withdrawing from the research

What will happen if I take part?

There are 2 ways in which you can take part. You will be asked to take part in

A short interview with Frances Wilson. You will be asked a few questions about your experiences of using computers and the internet.

A group discussion (focus group) with Frances Wilson. You will be asked to take part in a small group discussion to discuss your experiences of using computers and the internet and what sort of things may help or stop you from developing your skills.

What are the possible disadvantages and risks of taking part?

There are no known risks of taking part I the study. The main disadvantage is the time it will take to participate in one or both parts of the study.

What are the possible benefits of taking part?
Taking part in the study will provide Kisiizi with more information about the level of IT skill and computer knowledge contained in the group of nurses undertaking the CPD project. It may contribute to additional training and equipment being available in the hospital for training and development purposes which may benefit everyone employed in the hospital

Will my taking part be kept confidential?
All information that is collected will remain strictly confidential. Any information about you or your individual views will be made anonymous so that you cannot be recognised from it

What will happen to the results of the research study?
The research study findings will be initially reported to the University of Chester and to the Kisiizi Hospital management committee and made available to the participants of the CPD programme. The work is also part of a PhD project. It is also hoped that the finding s will be published in a health care or educational journal and at a suitable conference during the next year.

Who is organising or supporting the research study?
The research study is being organised by Frances Wilson, supported by the University of Chester, Ann Bryan, Head of Department, Professor Helen Cooper and Dr Martin Evans, research supervisors. Permission is also sought from Kisiizi hospital management committee to undertake the interviews and focus groups and the University of Chester, Faculty of Health and Social Care Ethics Committee.

Who has reviewed the research study?
The research study has been reviewed by the University Faculty of Health and Social Care Ethics committee. The original PhD proposal has been accepted by the Graduate School, University of Chester and Research committee. THET have been contacted to ascertain what if any further permission is required.

Contact for further information
If you require any further information about the research, please contact Frances Wilson Tel: 44 1244511651 or 07866698691 or f.wilson@chester.ac.uk

Thank you for taking part in this research study

Consent form

Study Title

An exploration of nurses' IT skills and experiences of using internet technology for CPD and an observation of the cultural influences on this process.

Name of Researcher: Frances Wilson

Participant information number:

1. I confirm that I have had the purpose of the research explained to me. I have been given the information sheet and I have had the opportunity to ask questions ☐
2. I confirm that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and my rights will not been affected ☐
3. I agree to take part in the study ☐

Individual interview ☐

Focus Group ☐

Interview & focus group ☐

Name of participant	Signature	Date
---	---	---
Name of Researcher	Signature	Date
---	---	---

Appendix 3: Search strategy

Table 1: Databases, key words and refinements

Databases	Dates covered in search	Date of search	Search words refinements. Combinations of search words	Hits from 2017 search	Papers selected for further detailed scrutiny	Comments
CINAHL / PLUS Proquest Pubmed Science direct Socindex Web of Science	2000 – 2010 2000-2012 2000 - 2017	January 2010 June 2012 June 2017	Computer technology Utilisation of CT / ICT AND Uganda AND nursing AND CPD Nurse education (Scanned)	6m 13085 1486 1189 349 200	33 papers selected	2017 - Additional search terms were substituted after the initial searches to include LMIC, Africa and Global. In addition, papers also emerged in the specific searches of a more generalised nature, some of which were deemed relevant.
Google Scholar	2000 - 2017	As above June 2017	Computer technology Utilisation of CT /ICT AND Uganda AND PD nursing AND Nursing (Scanned)	5m 229,000 43,400 15,700 1710 40	4 papers selected	As above
CINAHL / PLUS Proquest Pubmed Science direct Socindex Web of Science	2000 - 2017	January 2010 June 2012 June 2017	Computer technology UgandaANDculture AND nurse education AND CPD AND nursing (Scanned)	 3326 2593 249 78 78	5 papers selected - culture	As above
CINAHL / PLUS Proquest Pubmed Science direct Socindex	2000-2017	January 2010 June 2012	CPD Uganda AND policy AND PD AND nurse education AND nursing	218 146 95	5 papers selected - policy	As above

Databases	Dates covered in search	Date of search	Search words refinements. Combinations of search words	Hits from 2017 search	Papers selected for further detailed scrutiny	Comments
Web of Science		June 2017	(Scanned)	95		
Google Scholar	2000 - 2017	June 2017	UgandaANDPolicy UgandaANDculture Nurse education/ nursing (Scanned)	8810 1000 50 50 + 50	1 – policy 2 - culture	As above

Table 2: Selection criteria

Selection criteria - 463 articles initially scanned from all refined searches (approximately) – 50 met the initial selection/inclusion criteria. Inclusion – words in title and/or abstracts were read on first scan of the literature to identify possible articles. Words were either identical to search terms or synonyms. Examples are given in the table below. After the initial selection the papers were subdivided into three sections pertaining directly to Uganda; Africa and low and middle income countries; or Global relevance. Papers with policy and/or culture in the title were listed separately. Exclusion – even though specific terms were used, many papers were very generalised. papers were not rejected because of the methodology – all papers initially considered. Some papers were not research based, but rather literature reviews and opinion papers. These were retained for general back ground material and inclusion where the source was of high quality 49 papers were scrutinised and divided into themes. Some were rejected on the detailed reading of the article. Remaining articles were selected for critical review			
Uganda – 18		Africa, Low and middle income countries - 22	Global (reach) - 9
UGANDA – relating directly to Uganda / ICT Nurses/Health workers/Doctors Lifelong learning/CPD Education programmes Education and training Library services Telemedicine information systems/ Health information access Nurse teaching/education/CPD Barriers/Benefits ICT Skills and usage/Knowledge and attitudes Perceptions		Online CPD library User acceptance K and A to computer Mobile technology and social development Online learning-CPD E learning/ distance learning IT/ ICT in developing countries Access to electronic health Internet access IT training	Computer literacy /attitudes Nursing and ICT Globalization and ICT in nursing Developing curriculum (IT) Technology based teaching
Year of publication	UGANDA – 18	AFRICA/LMIC - 22	GLOBAL RELEVANCE – 9
2000	1		
2006	2	2 (Culture)	1
2007	1	4	
2008		2	2

		1 (Policy)	
2009	1	1	
2010			1
2011	3 1 (Policy)	2 (Policy)	1
2012	1 1 (Policy)	1	1 (Culture)
2013	1	3 2 (Culture)	
2014		2	2
2015	1 1 (Culture)		
2016	2	1	1
2017	1 1 (Policy)	1 (Culture)	

Table 3: Distribution of literature by year range and geographical location

Year range	Uganda			Africa, LMIC			Global		
	ICT/CPD	Culture	Policy	ICT/CPD	Culture	Policy	ICT/CPD	Culture	Policy
2001 - 2010	3			6	2	1	2		
2011 - 2012	3		2	1			1	1	
2013 - 2017	5	1	1	5	3		3		

Table 4: Inclusion strategy based on PEO, by geographical location

Inclusion criteria – based on PEO	Papers numbered 1-50																						
Uganda – research articles	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**					**39**	**45**	**46**	**47**
Selected/rejected					**X**			**X**						**X**	**X**								
P																							
Uganda /ICT/TEL	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	X								
Nurses/health workers/doctors	Y	Y	Y	Y		Y	Y			Y	Y	Y	Y		Y								
University students		Y	Y	Y		Y	Y		Y	Y	Y		Y		Y								
Computer technology	Y								Y				Y										
CT utilisation/ skills				Y			y					Y	Y										
Telemedicine information systems	Y									Y			Y										
Health information access/online			Y										Y										
Internet/access	Y		Y	Y																			
E																							
Nurse teaching/education/CPD						Y	Y	X			Y				Y								
Lifelong learning							Y																
E-learning/learning	Y	y									Y												
Mobile learning		Y	Y																				
Education programmes							Y																
Education and training/ICT literacy/competence	y		Y	Y					Y														
Library services	Y			Y		Y	Y		Y			Y	Y										
Barriers/benefits ICT	Y						Y				Y		Y										
Culture			Y							Y				Y									
Policy						Y	Y		Y				Y										

Theories										Y													
O Skills and usage/Knowledge and attitudes	Y	Y	Y	Y		Y	Y				Y												
Experiences																							
TYPE OF STUDY	QL	QN	QL	QN		QN	QN		X	M	P/M		M										
Africa/LMIC – research articles	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**38**	**40**	**41**	**42**	**43**	**48**	**49**	**50**	
Selected/rejected				**X**				**?**	**X**	**X**													
P Uganda included /LMIC/	YY	YY	NY	YY	NY	NY	NY	NY	NY	NY	Y/Y	YY	NY	YY									
Nurses/health workers/doctors	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y									
Online CPD library	Y										Y												
Mobile technology				Y		Y																	
Online learning-CPD	Y				Y	Y	Y																
E-learning/ distance learning	Y					Y	Y			Y			Y										
IT/ICT/HIT in developing countries	Y	Y	Y	Y		Y		Y	Y		Y	Y	Y	Y									
E Access to electronic health			Y				Y	Y			Y	Y	Y										
Internet access IT training	Y					Y						Y	Y	Y									
Social development		Y	Y							Y													
Barriers/potential	Y	Y	Y		Y		Y	Y	Y		Y		Y										
Culture								Y															
Policy	Y					Y						Y		Y									
Theories/models		y			Y						Y												
Capacity building							Y																
Cyber cafes										Y	Y	Y											
O Skills and usage/knowledge and attitudes/perceptions	Y		Y		Y	Y	Y																

Experiences		Y	Y								Y												
TYPE OF STUDY	M	QL	QN	ETH	M	M	R	R	R	R	M	QL	R	R									
Global research articles	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**44**														
Selected/rejected				**?**			**X**																
P																							
Nurses/health workers/doctors	Y	Y	YN	Y	Y	Y	Y	Y															
Computer literacy/skills/comp	Y																						
Nursing and ICT	Y	Y	Y	Y	Y	Y		Y															
Globalisation and ICT in nursing	Y	Y		Y	Y	Y																	
EBP (Tool)	Y	Y				Y																	
Internet/cyber cafes	Y		Y																				
E																							
Technology based teaching	Y				Y			Y															
Developing curriculum (IT)						Y	Y																
Barriers/potential	Y	Y	Y	Y	Y	Y		Y															
Culture			Y			Y	Y	Y															
Policy			Y					Y															
Infrastructure			Y	Y																			
O																							
Skills and usage/knowledge and attitudes/perceptions	Y	Y			Y			Y															
Experiences																							
TYPE OF STUDY	QN	QN	R	R	QN	R	S	QN															

Appendix 4: Informant details

Table 1: Informants by allocated number, role and type of contact

Allocated number	Work location/role	CI= Conversation informal CIA – 2009 CIB – 2010 CIC – 2011 CID - 2012	Focus Groups 1,2, 3 FG1 - 2011 FG2 - 2011 FG3 - 2012	RI= Recorded interviews RIC – 2011 RID - 2012 RIE - 2013	UI= Unrecorded interview UIC – 2011 UID - 2012	Total number of contacts
1	Infection Control Nurse		FG2			1
2	Senior Nurse/Missionary	CIA			UID	2
3	Driver	CIA				1
4	Nurse in Pharmacy		FG2 FG3			2
5	Engineer/Missionary	CID				1
6	School of Nursing - tutor		FG2			1
7	IT specialist/hospital lead	CIB CIC			UIC UID	4
8	School of Nursing - tutor		FG1			1
9	Nurse		FG1			1
10	Head Nurse/ SMT (retired 2012)		FG2			1
11	Nurse		FG2			1
12	IT administrator				UID	1
13	Medical Director (2)/ Missionary/SMT	CID				1
14	Nurse		FG3			1
15	Nurse paediatrics – In Charge		FG2			1
16	Nurse		FG1			1
17	Senior Nurse surgery – In Charge		FG1 FG3	RIC RID		4
18	Nurse – out patients		FG1			1
19	Senior nurse – outpatients – In Charge	CIA	FG1 FG3		UID	4
20	School of Nursing - tutor			RID		1
21	Senior Nurse – deputy 2012 – Head Nurse / SMT	CID	FG1 FG3		UID	4

Allocated number	Work location/role	CI= Conversation informal CIA – 2009 CIB – 2010 CIC – 2011 CID - 2012	Focus Groups 1,2, 3 FG1 - 2011 FG2 - 2011 FG3 - 2012	RI= Recorded interviews RIC – 2011 RID - 2012 RIE - 2013	UI= Unrecorded interview UIC – 2011 UID - 2012	Total number of contacts
22	School of Nursing – Acting Head	CID				1
23	IT specialist (external)	CIC		RIC		2
24	Nurse	CIC				1
25	Senior Nurse – paediatrics		FG1			1
26	Senior Nurse – infection control		FG2 FG3	RID		3
27	Hospital administrator			RIC	UID	2
28	School of Nursing – Head (left 2011) SMT	CIA		RIE		2
29	Senior Nurse– ultrasound	CID				1
30	Nurse		FG1			1
31	Senior nurse - Mental Health		FG2 FG3	RID		3
32	IT	CIC				1
33	Senior Nurse – outpatients		FG2 FG3			2
34	Senior Nurse – midwife		FG2 FG3			2
35	Nurse - isolation		FG2			1
36	Nurse - theatres		FG3			1
37	Medical Director/SMT (1) (Left 2011)			RIC	UID	2
38	School of Nursing – (Left 2012)	CIA CIC	FG1	RIC (individual) RID (Joint) RIE Individual)		6
39	Nurse		FG3			1
40	Nurse		FG3			1
41	Hospital accountant/Missionary/ SMT	CIA				1
42	Health visitor/ Missionary	CIA				1
43	Hospital Chaplain/SMT (Ret 2010)	CIA				1

Table 2: Number of occasions informants participated

No. occasions	No. Informants	Informants
1	29	1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 24, 25, 29, 30, 32, 35, 36, 39, 40, 41, 42, 43
2	7	4, 23, 27, 28, 33, 34, 37
3	3	19, 26, 31
4	3	7, 17, 21
5	1	38